

Yu. GRITSMAN

Science  
vs.  
cancer

MIR PUBLISHERS

MOSCOW

The book enters into the series of contributions devoted to the problems of cancer. In a language accessible even to those who are professionally not concerned with oncological studies, and with the help of numerous examples from the history of medicine Professor Yu. Gritsman acquaints the readers with some of the major and most recent achievements in this domain of science, and devotes no little space to the criticism of the spurious methods of treating this disease, which are advocated by the pseudo-scientists whose witchcraft continues to cause considerable harm to the patients.

As its predecessor *Men vs. Cancer* by B. Shubin and Yu. Gritsman (English translation, Mir Publishers, 1987) this book will undoubtedly find the appreciation of many a reader who will cover its pages with no minor interest.

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## **SCIENCE VS. CANCER**

Ю. Я. ГРИЦМАН

БЕСЕДЫ  
ВРАЧА-ОНКОЛОГА

ИЗДАТЕЛЬСТВО  
«ЗНАНИЕ»  
МОСКВА

Yu.GRITSMAN

# Science vs. cancer

Translated from the Russian  
by G.G. Egorov



MIR PUBLISHERS  
MOSCOW

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## Preface

Several years ago "Sovetskaya Rossiya" Publishers issued a book by the well-known Moscow oncologists and publicists Boris Shubin and Yurii Gritsman entitled *Men vs. Cancer*. A creative work, it skillfully brought together scientific generalizations, information on the struggle against malignant tumours, and essays about some of the prominent physicians involved in anti-cancer activities.

The book contained a small chapter in which medicine and quackery were discussed in opposition to each other. In the Preface I wrote that if the exposure of any pseudo-scientific phenomena had a predominantly educational character in medicine, especially in oncology, it was directly connected with the saving of human lives.

The ideas that were seemingly outlined in the first book received more profound and detailed treatment in the new book by Professor Gritsman, written after Shubin, his friend and invariable co-author, prematurely died in 1984.

Oncologists throughout the entire world have made a great effort to actively and opportunely detect cancer in people, to put a precise diagnosis of the disease, and strive

for wholly effective treatment. The progress in oncological studies has been so great that in many countries the patients are no longer kept in the dark about the essence of their illness. The most important thing is that all the successful cases which the author describes in his book are based on the favourable outcome of scientific quests. It would be appropriate to mention here that the numerous suggestions advocated by those lacking in competence have utterly failed to improve the results of treatment.

Over the past decades there have appeared quite a few "skillful" men of medicine who promised fantastic discoveries and strove for resounding popularity. But not one of them was able to cope with the rigid test of time and disappeared into the sunset together with their methods and medicines. Medical science, although in a state of "marked depression", as some writers proclaim, continues to exist, develop and make further progress. What serves as the main proof of all this is that two million people living in the USSR today have been virtually rescued from cancer. A detailed and interesting account of it is given by the author in the forthcoming pages.

Meanwhile theoretical oncology does not yet have a sufficient amount of information for the creation of a comprehensive and integrating theory which would adequately explain the origin and development of ma-

lignant tumours. Although the biology of the tumoral cell and the reaction of the organism to the growth of tumours have been studied very thoroughly, the period covering the accumulation of the required data and their synthesis is not yet complete.

In the treatment of cancer patients there is still much room for improvement. The possibility of saving patients becomes limited when it is either too late to render any assistance, or in the specific and fortunately infrequent cases of malignant tumours.

Such objective circumstances promote the emergence and propagation of pseudo-scientific methods of treatment, particularly in oncology which, as it should be kept in mind, is in all respects a dangerous aspect, or "the hot-bed" of medicine. More harm than good is caused to people in this instance. Gritsman also deals with this in his book in a manner that readers will find totally convincing.

The book has a specific structure. The first two chapters are devoted to what has actually been achieved by contemporary oncological studies, while in the subsequent chapters the author dwells on the harm caused to the cancer patient by incompetent enthusiasts, sciolists, quacks and those who do nothing but cheat the public.

The logical and profound description of scientific problems of modern oncology, together with the analysis of "parascien-

tific" trends and activities and reminiscences of an experienced doctor, make a fascinating story about people and their work.

There can be no doubt that this captivating and highly useful book will gratify and benefit the most demanding reader.

*N. Napalkov*

Academician of the USSR  
Academy of Medical Sciences, Professor, Chairman of the USSR Society  
of Oncologists

## Foreword

It was some twenty years ago at the Moscow regional oncology hospital that I got acquainted with a young doctor whose competence, inquisitive mind and particularly logical way of reasoning could not but attract me to him. In those years the staff at that hospital included some very enthusiastic people, many of whom later became prominent specialists. And even among these remarkable personalities Boris Shubin was easily distinguished by his purposeful character and enormous scope of interests.

This hospital is still situated in beautiful park dotted with ponds and cottages that were once occupied by the personnel. The entire staff was friendly with each other and lived a very interesting life. I enjoyed visiting them any time of year, not only for professional matters, but to saunter and talk with those highly intellectual, educated people, especially with Boris Shubin.

As a result we thought of a very complicated theme for Shubin's doctoral thesis. And when after a very short period of time he brought me a practically complete dissertation I could not but feel surprised, to say the least. As is often the case the sci-

tific adviser himself has to put quite a lot of work into the dissertation; but with Shubin, I blushed at the thought that I was his official guide. What I now had to acquaint myself with was an excellent piece of research produced by a mature scientist who went on to successfully defend his dissertation and was elected to a scientific post at the Herzen Research Institute of Oncological Studies in Moscow. We worked together all the following years.

Shubin became wholly absorbed in his favourite work and hardly left the operating room even for a fraction of a second. Soon he had his own laboratory, and in a short amount of time surrounded himself with students, published two monographs and a large number of articles. At the same time he managed to devote a great deal of time to his family, particularly to his little granddaughter—the apple of his eye for the last two years of his life. One could not but wonder how he found the time to write such excellent reports and stories, or especially how he managed to publish delightfully interesting books on Chekhov and Pushkin.

Shubin's attitude towards work was astonishing. It was especially apparent in his professional activity. He was born a doctor. Every day not only did he take an active part in treating his patients, but was also constantly arranging hospitalization for someone, or telephoning his colleagues about

the condition of patients he himself did not know, but was asked to inquire about. Boris Shubin was busy from dawn to dusk but never made any fuss about it. He always knew exactly what to do, when and whom to see and whom to think about. He loved people and tried to help them as best he could.

Once in a courtyard near the Kursk Railway Station in Moscow I showed him the small monument dedicated to Doctor Gaaz. On it were written the words: "Do Good and Do It Now"—a principle to which Doctor Shubin adhered all his short life. This is probably what explains his interest in Gaaz as the protagonist of a book he intended to write only after the work on our books *Legends and Truth About Cancer* and *Men vs. Cancer* was finished. He did manage to begin writing it, but left it unfinished due to his death as a result of heart failure in 1984. He was a little over fifty at that point and died at his post, so to speak. After a hard day's work as an oncological surgeon, he stopped home for materials on Dostoevsky and Gaaz for a lecture he was to give at one of the Moscow museums. He suddenly felt very bad and his life could not be saved.

In this book, particularly in the first two chapters, there might be something that was written by Boris Shubin himself. Discussing the oncology of today and tomorrow I have to some extent used what we

had done together before, but it is practically impossible to say to whom a certain contribution belongs.

There is one more thing that I can do for my dear friend, and it is to dedicate to his bright memory the book which we planned to write together, but which I alone was destined to produce.

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## Chapter One

# Oncology Today

Ten years ago Boris Shubin and I compiled a very simple questionnaire and polled about one thousand people who had absolutely nothing to do with medicine at all. Our aim was not only to satiate our curiosity, but to discover exactly what the public at large thought of cancer. The many years of work as physicians made it quite clear to us that no other disease had ever given rise to so many myths and cock-and-bull stories as cancer.

We became convinced that a large number of people have no more than a superficial idea about the subject that we were concerned with, and that myths about cancer were viable indeed.

The analysis of the questionnaire served as the basic material for one of the chapters in the book *Legends and Truth About Cancer* in 1978.

When we started working on the book we were confronted with the difficulties in depicting the actual state of things in current oncological studies. Then we turned for help to some of the most prominent scientists and practitioners in the field of oncology in our own country, the USA, Great Britain, Hungary, Sweden and Fin-

land, with the request to answer several of the following questions:

1. What is cancer?
2. Is there any hope that in the twentieth century there will be a tenable theory of the etiology and pathogenesis of malignant growth?
3. Will the tumoral antigens that are typical only of cancer be discovered?
4. Will it be possible to discover a specific and yet simple reaction for the determination of cancer at an early stage?
5. Can we expect to have in the next thirty to fifty years anti-tumoral drugs that would prove efficacious in most cases of malignant tumours?
6. What has been the most substantial achievement in oncology over the past fifty years?

The questions that seemed most natural were found to be rather difficult by our colleagues whose answers were by no means identical. Our American colleagues even suggested that the questions should be discussed at a special symposium.

### **A Burning Mystery**

There is nothing surprising that under the circumstances stemming from the past ten years, people without professional training, but with a great desire to get to the bottom of the burning problem of cancer, are easily led to believe all the myths and

legends about the disease. A very large number of those who crave to be cured of this disease, readily credit any sensational information provided by the press. They assume that in some far-away country the cure for cancer is more close than in their own country, where the results of any research are more accessible and can be verified more easily. Therefore, it was not by chance that thousands of Europeans, especially from France, rushed to the Philippines, when the media, although not totally reliable, spread the myth about the fantastic achievements of Philippine "doctors".

Factors that give rise to phenomena of this kind have on the whole been studied thoroughly and scientifically analyzed.

The first reason is purely psychological. It has been examined and described by American psychologist S. Camp in research conducted in his own country; according to D. Mayers, about 60 per cent of the Americans believe in "paranormal phenomena". Camp wrote that science is becoming more complicated, specialized and thus getting to be more difficult for the layman to understand. Camp believes that an ordinary person finds more and more obstacles in his way, trying to catch up with scientific discoveries. On the other hand, pseudo-scientific myths help the credulous layman feel, amidst the vortex of scientific progress, that he can share some kind of esoteric knowledge without making any special effort.

In addition to this reason, which seems to be typical of humankind in general—the craving of people to unravel the mysteries and not only in oncology—there are other factors referring to medicine and oncology in particular.

The most important of them is the obscurity of factors that condition the emergence and development of malignant tumours. This is exactly what makes incompetent people doubt the scientific validity of oncological studies. Consequently, the non-specialists make suppositions, ungrounded assumptions, and myths and legends appear. Meanwhile, over the past few years much has been done to reveal the secrets of cancer. Hence, it would not be out of place to innumerate the already established facts about the origin and growth of cancerous tumours.

What has been proved is that chemical and physical factors influence many types of tumours. This has given rise to the discovery and use of efficient prophylactic methods against occupational cancers.

The role of viruses in the formation of some malignant tumours continues to be actively studied.

A role of the endocrine system of the organism in the course of the tumoral process has been clarified.

The following theoretical findings have been made which pertain to the characteristic features of the structure and functions

of tumoral cells: the production of embryonal protein, the loss of contact inhibition, the reversibility of tumoral transformation in principle, the participation of immunological mechanisms in the development of tumours and many others.

The progression of tumours has been studied to help in understanding their infinite variety as a manifestation of biological regularities.

We have witnessed the emergence of drug therapy and its development into a branch of science dealing with the treatment of malignant tumours.

It is now possible to use high-energy apparatus and radioactive isotopes in radiotherapy. Enormous progress is being made in surgical and combined and complex methods of treating oncological patients.

What may well be regarded as the principal achievement in the past fifty years is the creation of a well-balanced system for the struggle against cancer. It has proved to be adequately effective and is being continuously developed and improved.

Academician Nikolai Blokhin says: "Cancer is called the disease of the twentieth century since it is precisely in this age that the problem of cancer has been brought out among many others. The twentieth century has also made it possible for the most proportionous conditions in which research into this highly complicated problem could be carried out."

## Ignoramuses Challenge Oncology

In the beginning of the 1970s the book by the professor of theology Ivan Illich *Medical Nemesis* was much talked about in the West. Its prejudiced author made every effort to avail himself on those cases when treatment failed to cure. He took advantage of the limited possibilities that medicine has to tackle diseases and even went so far as to declare that doctors not only were of little help in serious situations, but were often responsible for the deterioration of the patient's health, leading to new and various medicinal and psychiatric illnesses. In his opinion it was all nothing but an attempt to combat illnesses that did not lend themselves to treatment with the help of "worthless methods" (cancer was certainly heading the list of such disorders). If the patient whose case was hopeless was unaware of the diagnosis and did not undergo any treatment, he would feel much better during the two-thirds of life in the time that was left for him.

Such ungrounded and incompetent statements regarding the achievements and failures of medicine did not originate today. Since time immemorial people have taken upon themselves the right to assess the work of a physician, without having the slightest idea of what he was able to do and what lay beyond his scope of ability. The following episode is from the Russian his-

torical chronicles: "Once upon a time a certain foreign physician whose name was Anton gave his patient Prince Karakuch a poisonous concoction for having been made fun of. The Great Prince John III, though letting the son of the deceased Prince torture the culprit for a while, refused bail and sentenced the man to death. Thus they took the prisoner to a place under the bridge of the Moskva River and stabbed him in a sacrificial manner."

It goes without saying that nowadays there is no question of inflicting such a brutal punishment on anyone whose treatment was unsuccessful. However, the demand to severely penalize the physician for the death of his or her patient still remains a frequent occurrence.

The above can be interpreted in two ways: it is either the implicit faith in the omnipotence of medical science, or quite the contrary—the total disbelief in it and the desire to return to "mother nature" or to find a wizard who is in possession of some special methods of treatment. All this is due to the lack of competence regarding the level of our knowledge today.

There are enormous achievements made in many fields of medicine. They are so great that they have a marked impact upon such social aspects as the length of human life and the number of the whole able-bodied population. Meanwhile, what is published in the press for the public at large is pre-

dominantly of a sensational character—information on a cancer cure by means of herbs or the inculcation into medicine of new technical facilities. The fact that they are significant can hardly be underestimated; however it cannot be overemphasized that they have practically no influence upon the essence of the development of public health in this country, this particularly in reference to oncology. In most cases patients are kept in the dark that they have a malignant tumour. If such a person was cured, neither he nor his acquaintances would ever find out about the disease. There are already more than 2,000,000 people of this kind in the USSR, 50 per cent having survived for over 5 years and 20 per cent for more than ten.

Quack doctors and pseudo-physicians lose no time in availing themselves on an occasional information gap to advertise their miraculous cures—word is spread among the people at the speed of lightning.

Those who go for help to such “specialists” are not predominantly illiterate laymen. Quite the contrary. Strange as it may seem, they are highly educated people who read a great deal of various types of literature in which, from time to time, they find indiscrete and incompetent information on “the new methods”. What they most perseveringly try to put their finger on is the hitherto unknown, as it were, original

methods of treating cancer. These people are usually not the patients themselves, but their relatives and friends.

Hardly a day passes without there appearing some writer, journalist, a researcher who has nothing to do with medicine, or sometimes even a doctor working in a field quite different from oncology, who comes for advice concerning a patient with a neglected tumoral process. They offer the methods that are published and which seem to have cured someone. People want to help us so ardently that very often and without any good reason they proclaim an occasional wonder-doctor, and start propagating his "method". We still remember how twenty years ago a group of well-known Leningrad writers supported in the press "the wonder-healer" Kachugin. Meanwhile, the inefficiency of his method was most distinctly brought to light by means of elaborate clinical research. And what is "the inefficiency of a method" if not a fraudulent waste of precious time!

For the sake of giving some kind of encouragement to the relatives and friends of a dying person, the physicians often erroneously refuse to immediately reject the possibility of quack doctors. Statements like, "Well, there is nothing to be done about it. Why not try?" ... or "The patient is absolutely hopeless. It might help to..." serve as evidence that the physician is professionally inadequate.

The doctor's attitude towards non-professional methods of treating the patients should be adamant and inflexible. Any other reaction cannot possibly be encouraged since such methods are hazardous for the patient and damaging to the name of medicine. This often results in a curable patient particularly with a malignant neoplasm, refusing to undergo any treatment whatsoever, thus signing himself a death sentence.

Thus, a very important reason why quackery exists is because of the misleading attitude of some doctors, which leaves a certain chink in the armour against non-professional statements and activity.

The next but no less significant reason is the opinion of a large number of people who have absolutely nothing to do with medicine, and yet regard themselves competent enough to make use of mass media. Would it not be ludicrous if an oncologist were to give professional advice to an engineer as to how to build a bridge, or to a writer about how to write stylistically. However, many people think that if medicine has found itself at an impasse (I wonder where the contretemps is!), they can lavishly give recommendations in an artistic form.

It is not infrequent that the characters in a modern piece of writing discuss whether they should trust the doctors implicitly when the first symptoms of any indisposition manifest themselves, or take no measures at all and hope for the best.

In Vladimir Soloukhin's story *The Verdict*, which is a specific report of the case history of a certain hero, there is an episode in which the narrator meets the man who the author thinks has a malignant pigmentary tumour.

A black flattened globule (for want of a better word) was nestled in his breast in comparison with my own pea-sized globule, like a chicken compared to a mature turkey. Its size was that of the five-pence piece with several lintels encircling it.

"I could not help exclaiming: "How long has it been there?"

"Eighteen years. For fifteen years it remained no larger than a pea, and for the past three years it has been growing. I think that I still have about five years to go."

Thus, eighteen and five is twenty three. This is the fate of a man who "pulled himself away" from the dangerous shore since there is hardly a single patient who has, after being operated on, managed to survive for such a number of years. The tumour may well be regarded as benign if the person continues to live within the projected period of time. It is often the case that people die within the first months after an operation and seldom (10 per cent) live more than three years afterward. Hence, one has no other option but to decide whether to land upon the shore swarming with crocodiles and cannibals or to swim away from land back into the open sea..."

This story as well as many other literary compositions produced by Soloukhin are written in a very open-hearted manner. That is why the paramedical disquisitions of his protagonist are apprehended by some of the readers without due criticism. We know that some of the patients with a malignant pigmentary tumour went so far as to refuse surgical treatment after they read *The Verdict*.

Let us analyze the quoted passage from the viewpoint of an oncologist.

Generalization, or the spreading of the process, in the case of the removal of a malignant skin tumour becomes possible in two instances: when it is removed nonprofessionally (for example, by means of applying the thread ligature, or to save any extra effort—too close to the tumoral tissue) and if metastases (cases of the transfer of the cells of a malignant tumour) have emerged prior to the operation and have not manifested themselves for the time being. And indeed, since the tumour is no longer there, where could the metastases come from? This means that the operation was performed as late as in the fourth period, the time when the illness does not lend itself to treatment any more. But if the tumour had been there for 15 years and only then began to grow, there was enough time to have it safely removed. It would be possible to state that there was no need for the narrator's acquaintance to count the remaining years of his life.

Benign tumours can also grow. But when increasing in size they do not penetrate into the surrounding tissues and never give rise to metastatic processes. Therefore the fact that the tumour had developed in the course of those three years could not serve as proof of its malignant character.

Neither is it clear why the patient was thinking of living for no more than five years. Why the arithmetic, if there is no imminent danger in the offing? If, however, he has a malignant melanoma, then without treatment he deprives himself of any chance to enjoy a long life. Any unnatural system of estimating what has been allotted by fate carries no basis at all and is quite inappropriate when it comes to answering such a highly important question as to whether give one's consent to be operated on or to refuse to give oneself away to "crocodiles and cannibals" and swim away into the sea of mysticism and quackery.

To conclude this part of the analysis it would be apposite to acquaint the readers with some statistical data. The layman's favourite examples are similar to those of Soloukhin's story character: one man died soon after the operation, while the other who refused surgical aid is still going strong.

How is it possible nowadays to start juggling life and death because of some rumours and sporadic facts of a dubious nature. According to authentic statistical data in

40-63 per cent of all the melanoma cases the patients, with whom no obvious metastatic processes had been discovered before they were operated on, have already lived for five or more years.

In his *Letters from the Russian Museum* Soloukhin expresses a very judicious idea that art should be appreciated from a sciolistic point of view.

To some extent medicine is art too. And yet there is so much harm done when medical subjects are discussed in the press by someone who lacks any substantial professional training. As Boris Shubin said sciolism is appropriate to the state of illness alone.

To be quite fair it is necessary to say that besides men of letters we also meet certified doctors who avail themselves of the mass media to propagate various medical legends.

As can easily be seen there exist fairly cogent reasons for the survival of oncological myths that prevent the public at large from seeing the true picture of the strenuous, fascinating and ever progressing struggle of science against cancer.

### New Answers to the Old Questionnaire

Now we return to it. The answer to the first question—"what is cancer?"—was given on the basis of the definition furnished by Academician Lev Shabad: "...cancer as

a pathological process is the disdifferentiation and reproduction of the cells of an organism, which transfer these properties to their descendants." It was especially obvious that there is no such thing as a single kind of cancer; instead there is a variety of tumours, representing diverse nosologic units (diseases). The term cancer covers about 200 malignant disorders. Cancer can mean merely the generic designation of highly varied processes in the same way the term "fever" in the past amalgamated a host of different illnesses that were accompanied by a high temperature and a fit of shivering.

Since one of the more distinctive features of cancer is the presence of a tumour (plus tissue), it becomes primarily important to clarify the concept in question.

Tumours are usually treated in terms of a binary classification: according to their origin (i.e. the tissue that gave rise to them), and the character of the growth.

As far as the first feature is concerned, tumours are divided into epithelial—those that originate in the epithelium, or the integumentary tissue (skin, mucous membrane, etc.) and connective-tissue ones, which emerge from the connective tissues (bones, ligaments, etc.); this variety also includes tumours of the lymphatic and haemopoietic systems.

The epithelial tumours are called cancers, while the connectives are referred to as sarcomas.

Besides the malignant tumours there can also be those of the benign variety, which do not "propagate" in the organism, as a rule, and do not cause the patient any discomfort, though in some localizations (in the brain, for instance) they can bring about tragic consequences.

The main distinctions between the two types of tumours are given in the following table:

Benign tumours	Malignant tumours
Slow growth, usually	Rapid growth, usually
Grow and make their way through tissues	Destroy the surrounding tissues as they grow and penetrate deeply into them
Do not yield metastases	Metastatic processes often take place
The structure of original tissue is retained	The structure of original tissue substantially deteriorates
The cells reproduce at the same rate as in the healthy tissue	There are a large number of dividing cells

When we think of the nature of cancer, the two following concepts are very often confused: What is cancer and what brings it about? If these two questions were not distinctly separated, it would be very easy to lose one's way in scores of various theories and suppositions.

Most of the malignant neoplasms of clone origin, that is, the cellular elements comprising the tumour, are derivatives of a single cell.

The healthy cell, before it is transformed into the tumoral one, presumably undergoes a continuous chain of alterations and acquires the properties that are markedly distinct from those in the initial stage. It is incredibly difficult to trace this transformation step by step; it might be altogether impossible, since the life period of a normal cell is limited and its reproduction (division) can coincide with the time pertinent to the tumoral restructuring. Then its descendants, not even in the first generation, will become malignant rather than itself. In spite of the difficulties there still exist objects which allow us to imagine the basic components of the given process—not only in experimental, but in clinical conditions as well.

In the 1940s the American scientist George Papanicolaou made a statement that with the aid of the microscopy of smears containing even individual cells from the surface of the tumour, it becomes quite possible to determine the character of the illness.

The method has proved to be extremely efficient in the preventive examination of women. The investigation of scrapings from the neck of the uterus (a perfectly harmless procedure) had already yielded both medi-

cal and sociological results, saving several thousand lives. Besides, the oncologists have had the chance to observe the cells from the very first distortions of their structure to the emergence of the initial forms of malignant tumours, and in rare cases—when the women had refused the offered treatment—a genuine and already developed cancer.

These step-by-step observations may well be compared to a construction site with work in progress as we watch it while aboard a moving train. At one place they are digging the foundation pit, at another the foundation itself is laid, then we see how the walls are erected, and lastly, cars and trucks loaded with furniture drive up to the house. The flashing of this sequence of pictures in no way corresponds to the rigid sequence in which the house is built. Likewise it can be said that with one woman the cancerous cells found are already formed, while with another we discover only certain changes of cellular structure. Thus, according to discrete facts, the scientists have managed to recreate, in principle, the processes of tumoral transformation, substantiating the clinical material with experimental analyses.

Is it possible to draw a hard and fast line between the rapidly reproducing and proliferating cells and cancer? If yes, where does the boundary pass?

The Soviet oncologist and experimentor

Professor V. Shapot thinks that this boundary coincides with the moment when in the dividing cells there occurs morphological and biochemical variability. It is precisely at that moment the natural selection of cellular elements takes place. These elements are more autonomous, rapidly growing, and stable to defence reactions of the organism, and they are better adapted to the scanty supply of oxygen. The formation of a malignant tumour actually serves to prove that natural selection finds favourable conditions for itself in the individual development of a multicellular organism.

As it has already been said, in the course of their development tumoral cells lose structural as well as functional differentiation. They are already found to be independent of impacts, signals of the whole organism, and the tissue in which they grow. A fairly obvious example of autonomy is the increase of a tumour in a starving man when all the normal tissues are subjected to atrophy.

The complex of cancerous cells builds up more primitively than the original tissue. This phenomenon is known as anaplasia. Thus, the transformed anaplastic cells of a tumour in mucous membrane, which in normal conditions produces mucus, sometimes loses this property completely. The tumour of muscular tissue loses its contractile ability. The anaplasia of the cells reaches such a degree that under the microscope

it becomes in some cases difficult and at times impossible to determine from what tissue the tumour has originated. The basic function of the living cell changes too. It now produces protein, which is specific for the given tissue. Some tumours we find "have in a way returned to the original state", and they begin to synthesize protein, characteristic of the embryonic period in the development of organism.

Thus, if cause and effect were not confused, it would become quite feasible to determine cancer as an uncontrollable growth of cells that lose their differentiation—the specific organic character.

### **Hypotheses May Be Down But Not Out**

The second question of the questionnaire previously mentioned reads: "Is there any hope that in the twentieth century there will be a tenable theory of the etiology and pathogenesis of malignant growth?" Most of the scientists gave an optimistic answer the likes of: "It is hardly possible to work without hope." Some of our correspondents asserted that theories of this kind already exist like, for instance, the polyetiological conception and the chemovirological carcinogenesis. However, other no less authoritative researchers consider that "...though many factors conditioning the development of cancer have been established, they could not as yet determine what

exactly lies behind the transformation of a normal cell into a malignant one."

The discussion of this and a number of other questions on theoretical oncology gives one an ambiguous feeling. A cursory acquaintance with a certain theory, or a particular group of facts, may seem to indicate that this is exactly where the trouble lies. One more effort, and at last there would appear the possibility of either preventing cancer or at any rate a hope to treat the very essence of the disease and interfere in the intimate biological processes for the benefit of people. But a closer look at each of the theories makes us realise that the regularities which have been discovered with such difficulty do not have any universal significance in carcinogenesis, that each of them is only one of the hypotheses which can be if not totally refuted, then raise substantial doubts. What remains incontrovertible are the facts that so far describe separate fragments, but do not reveal the nature of the phenomenon in all its complexity.

The development of theoretical oncology may well be regarded as the most mysterious page in the history of biological science, the page that has not yet been written to the end.

First, the statement that is essential in principle.

It is customary to consider that for purposes of appropriate diagnosis, treatment

and organization of medical assistance it is, first and foremost, necessary to have a verified theory pertaining to the origin and development of malignant tumours, without which there could be no rational system of causal prophylaxis and struggle for the health of the patients. This means that it is pointless to expect any particular achievements.

There are two repudiating circumstances. Firstly, it is not always that the practical measures discovered come immediately after the nature of the disease has been found. Secondly, the experience that has accumulated until now gives us every reason to elaborate effective strategy and tactics. It is not always necessary to know the origin of a disease to successfully prevent and treat it, although the importance of such information facilitates the solution of the problem to a great extent. And yet at the end of the eighteenth century when no one had ever heard of viruses, the English physician Edward Jenner did find the means of preventing a highly viral small-pox and became a benefactor of the human race. It is interesting to observe that the first vaccination institute (Jenner Institute) was founded in London as long ago as 1803. At that time not only viruses but even microbes were something that nobody knew anything about. Moreover, even the solution of etiology did not do away with the problem. Let us consider tuberculosis, lep-

rosy and the plague. Many years passed between the discovery of their agents and the discovery of an efficacious means of combatting these diseases. Now, if tuberculosis were singled out as an illness with a marked social character, then the Calmette-Guérin vaccine in the same way as the modern system of medicinal, surgical and balneologic treatment could not suppress it. What was required were prominent social measures so as to totally abolish tuberculosis in highly developed, especially socialist, countries by the end of the twentieth century.

It would be quite wrong to assert that we know nothing about the origin of cancer.

There are many theories, and it is difficult if not altogether impossible to speak about each of them. However, two concepts draw our attention today. According to one of them, cancer develops as a result of external chemical impacts; the second is that cancer is of a viral origin. What deserves special mention is the fact that it is absolutely possible for malignant tumours to appear under the influence of outer (exogenous) physical factors, such as trauma and radiation injuries.

Cases when cancer and sarcoma develop due to traumatic reasons are comparatively rare. Lev Shabad, having studied this question very thoroughly, wrote that the great Russian surgeon Nikolai Pirogov aptly remarked that war was a traumatic epi-

demic. If a traumatic injury were really so hazardous, then one could expect an outbreak of tumours in the wake of every big war—sarcoma of bones and the soft tissues of limbs being first. However, as is common knowledge, this is not the case even though more than forty years have passed since World War II. This general principle is in no way hampered by individual observations immediately connected with traumas. Each of them can be interpreted in its own way.

As is actually the case, the oncologist finds himself sometimes involved with patients who unambiguously declare that their tumours (often visible) were preceded by a mechanical injury. And it almost always becomes possible to determine that there had been traumatization of a potentially malignant tumour, the injury accelerating growth and aggravation to the clinical situation of the disease.

Things are quite different in cases of radiation injuries. The carcinogenic role of external impact is obvious.

The case of "radiation carcinoma", when, in 1902, a German technician checked apparatus with his own hand, has already become a textbook example. In subjecting his hand to an X-ray analysis he regulated the power of the rays by the contours of his bones and thus determined the efficiency of the tube. The consequences of this kind of activity were very sad indeed. A serious

case of dermatitis and cutaneous ulcers were followed by the carcinoma of the skin.

In the later period it was discovered that not only the direct impact of the rays promoted the development of cancer, but no less hazardous was the intrusion into organism of radioactive isotopes.

The following extremely instructive observations of women working at a small factory in New Jersey (USA) were often published. During World War I they had to paint the dials of clocks and parts of military instruments with a luminescent dye containing radium and mesothorium. In those days this production process was a novelty and nobody could ever imagine that it would be so disastrous. They earned their pay by piece work and saw that it was much more convenient to wet the brush first in their mouth, so as to have a single tuft of bristles, and then to put it into the dye and make the required figure. There could hardly be any doubt that the women introduced a certain amount of radioactive preparation into their body. Within 10-15 years several scores of the women developed tumours of the bones. The question arises: why?

As soon as radium enters the organism it behaves like calcium: it penetrates the bones and settles there. But unlike calcium, it destroys osseous tissue. Within the cells changes occur that lead to a malignant tumour. Under these circumstances even the white blood cells, produced by the bone

marrow, are said to be threatened, and in conditions of radioactive radiation it can lead to leucosis. Large doses quickly cause death from anaemia and haemorrhages within a few years. The effect of small doses manifests itself after 20-25 years, usually in the form of malignant tumours.

A special medical discipline known as radiohygiene appeared and became widely developed, making use of preventive measures against radioactive injuries and the treatment of such patients.

Scientists began experimenting with animals. Depending on the radioactive preparation, dose, frequency, intervals, means of introduction and characteristic features of the biology of mammals used in experiments, tumours of quite a different kind developed. The carcinogenic origin of ionizing radiations has been irrefutably proven. But did this satisfy the oncologists?

In the first place, radiation energy rarely causes tumoral transformation. Secondly, the absolute (or, as they say, linear) dependence between the dose of radiation and the development of tumours has not been established. It is quite probable that what becomes endangered is not directly the hereditary apparatus of the cell, but the metabolism, and tumoral transformation emerges secondarily. What draws attention is the changes in the balance of hormones under the influence of the radiation energy with subsequent growth of tissue

in organs that experience hormonal attack, eventually leading to malignant neoplasms. One way or another, the study of radiation carcinogenesis enables us to have very valuable materials on the prevention of some types of cancer, and on establishing causes of this disease.

One of the first attempts to scientifically explain the origin of tumours dates back to 1775 when the English physician Percival Pott described "the cancer of chimney-sweeps", for which coal soot was responsible.

In later period it was noticed that with workers who built roads, and handled tar, bitumen and asphalt, carcinoma of the skin was on the average four times as frequent as with the rest of the population. Those more susceptible to lung cancer are workers in the gas industry, non-ferrous metallurgy, and asbestos factories. Occupational cases of this kind also include urinary bladder cancer, found in workers in the aniline industry. Tumours of the skin on people who have been taking medicine containing arsenic have been known for a long time. There have been quite a few cases of cancer among those who have used artesian water with a high concentration of arsenic.

What we have here is one of many paradoxes in the scientific study of cancer: the carcinogenic character of arsenic for the human being is quite obvious, but reactions of the same kind were not observed in experimental animals.

There are numerous researchers and entire scientific schools (in the USSR it is the school of the recently deceased Academician Lev Shabad) who support the theory pertaining to the origin of cancer on the basis of chemical carcinogens and who observe the life of a population, comparing people's life-styles with the frequency of those who have fallen victims to malignant tumours.

This work began as far back as the late 1800s. The list of established carcinogenic substances was growing fast. The first to be included were the components of the coal tar: the anthracenes and the derivatives of oil, then the group of metals comprising nickel, beryllium, chromium, lead, zinc, copper, and cobalt. They were further supplemented by turpentine, oils of orange and eucalyptus, and croton oil.

Information on occupational cancer led to the idea of testing widely-used industrial dyes. It also became clear that the intermediate product pertinent to the production of dyes—the aromatic amines—used in experiments with the animals provoked the emergence of tumours, as could be expected.

American researchers Raven and Roe assert that the channels through which food becomes contaminated by chemical carcinogens are practically infinite. They can get into food from synthetic packaging, from the inner surface of canned products, from the labels on which the printers' dye

is present. "Accidental" contamination is also possible in the storehouse and during the transportation. Some food itself contains carcinogens.

In the beginning of the 1960s observations were made at practically the same time in England and the USA, which at first glance were not directly concerned with oncology.

Within a short period of time in a number of English counties up to 60 per cent of all turkeys perished, a serious blow to agriculture. The complicated investigation involved not only scientists, but also representatives of Scotland Yard. The facts evidenced that the birds in those districts had been fed on highly calorific Brazilian earth-nuts or, to be more exact, on the flour made from those nuts. However, these nuts as an additional supply of food had been used for some time, and the question raised was "why"?

At the same time in the USA "the epidemic" of carcinoma of the liver (hepatoma) had affected trout and caused much concern. It was noticed that the disease was spread predominantly among the trout that had been cultivated in fishponds, while the "wild" variety caught by fishermen proved to bear no traces of any illness.

It did not take much time to contrast the growth of trout that contracted this disease and the transition to dry fodder from raw ration. Cotton seed proved to be the source of that misfortune.

Meticulous laboratory analyses proved that it was neither the earth-nuts nor the cotton seeds that was responsible. What brought about the illness was a substance produced by the mould which affects vegetable products in storage. In accordance with the Latin appellation of mould this substance received the name of aflatoxin. It has not yet been established if it plays any role in promoting carcinoma of the liver among people, although scientists tend to associate the spreading of this disease with the Negro population of the Bantu tribe, whose food consists mainly of wheat or maize. If we take into account the torpid and wet climate in which these people live and that they store grain, it is quite probable that they are affected with aflatoxin from their customary food.

The increase in the number of cases of lung cancer in most of the economically developed countries is to a great extent conditioned by the pollution of the atmosphere. It is not by chance that this form of cancer is not typical of those living outside the urban areas. Air pollution becomes particularly intense under certain weather conditions, when suspended particles of smoke form the so-called smog—a moist film enshrouding a town for several hours.

However, women fall victims to lung cancer five times less often than men. There is reason to believe that this question cannot be resolved without taking into account

the factor of smoking. (At present the number of women who have lung cancer is on the increase. As the famous Soviet oncoepidemiologist Professor A.V. Chaklin aptly remarked, a cigarette is the price for the outer appearance of independence.)

It is precisely the combination of life and work with smoking in the polluted atmosphere of a large city that most rapidly leads to this particular illness.

Essentially, smokers are carrying out a grandiose oncological experiment. R. Süss and his colleagues produced highly cogent data of about a million people in the USA who were under observation for over eight years. The death rate as a result of lung cancer was ten times greater among smokers than non-smokers. For the particularly heavy smokers, things were much worse with them. Those who smoke two packs of cigarettes a day have 24 times more of a chance to join the ranks of oncological patients.

Examinations conducted in England gave similar results: people who smoked 25 or more cigarettes a day died of lungs cancer twenty times more often. Men between ages 50 and 69, who had never smoked, contracted this disease 17 times less often than those who smoked twenty cigarettes a day. People who had abandoned this habit between one and ten years ago fall ill 2.5 times less often than those who smoke a pack a day.

The grave consequences of smoking tobacco are also pertinent to the chewing of nas—a mixture of tobacco, ash, lime and oil, or betel leaves, a habit shared by many in the East and South-Eastern countries. With a considerable number of people who have long been addicted to this habit, cancer appears in the oral cavity precisely where the mixture is inserted. Each region has its own rules: some put the mixture either under the tongue, behind the cheek, to the right or to the left, etc. Accordingly cancer develops either under the tongue, or in the mucous membrane of the cheek.

Several years ago at a Soviet-Polish symposium of oncologists, Polish doctors cited an interesting example.

In one of the rural districts in Poland a large number of cases of carcinoma of the stomach was discovered. The specialists got interested in the way food was usually prepared in this locality. It was discovered that housewives were wont to use the same lard in frying meat and vegetables for a period of more than one week. When heated to high temperatures the lard in the cast-iron frying pan changes its chemical structure and yields substances which, as a result of regular consumption together with food, give rise to the development of cancer. What had been scraped off the frying pans proved to be full of typically powerful carcinogens in experiments involving mice.

This research furnished concrete material for further prophylactic activity.

Presumably the factor of nutrition plays a substantial role in the emergence of carcinoma of the stomach. Special literature contains a sufficient amount of data on the interrelationship between tumoral processes and the continuous use of smoked meat and fish.

The proponents of the theory of carcinogenic substances, in consolidating their argumentation, adduce a generally known fact that in natural conditions tumours usually originate from the epithelium (the upper layer) of organs that lie between the external and internal media: skin, the gastrointestinal tract, and the lungs. The epithelium of these organs, functioning as a barrier, is the first to experience the influence of various hazardous substances.

Carcinogenic substances exert their detrimental effect not only when people find themselves in direct contact with them, but also through the mother's body—*intrauterinely*—by affecting the developing fetus.

To some extent this mechanism of carcinogenesis owes its discovery to a casual episode, yet more proof of how significant the contacts between scientists of different areas can be.

An elevator regularly used by epidemiologists in one American oncological institute broke down and they were obliged to use another one situated at the other end

of the building, next to the laboratory of morphologists. Involuntarily, conversations sprang up, sometimes on a professional level, between them. Once a certain morphologist related that within a short period of time he came across two cases of a rather infrequent tumour—that of the light-cellular carcinoma of the vagina. Soon he again mentioned a similar case, which attracted the professional interest of his colleagues. They rolled up their sleeves and began elaborate oncoepidemiological research and discovered that the light-cellular adenocarcinoma of the vagina occurred more often than "necessary" with those girls or young women who had been born as a result of preserving a pregnancy through the help of mass courses of treatment which presuppose the use of methylstilbestrol.

A special international register of tumours was made. It included those cases that resulted in the activity of various factors during the period of gestation. Today the catalogue includes several hundred descriptions. Moreover, Japanese scientists convincingly proved that the undesirable "inferences" in the period of gestation are fraught with future tumours not only with the first progeny, but also with the subsequent descendants.

The problem of transplacental carcinogenesis has become one of those that is of current importance in contemporary oncology and the anti-cancer struggle. In the

Soviet Union this trend of research is headed by Academician N.P. Napalkov of the USSR Academy of Medical Sciences at the Petrov Institute of oncological studies in Leningrad. Besides, we would do no more than justice to mention that Nikolai Petrov himself, as long ago as 1926, warned that the prevention of cancer begins with hygiene during pregnancy.

What could be also added here is the scientific study of endogenous factors of carcinogenesis. Strange as it may seem, but in the organism of animals and man there is a constant presence of carcinogens, which can, for some reason, suddenly start manifesting themselves.

As early as the beginning of the present century, doctors saw that deviations in the functioning of sex hormones were somehow connected with breast cancer. Then in the course of the experiment they became convinced that after various hormonal effects on experimental animals there was evidence of cases of benign as well as malignant tumours of the mammary gland, uterus, sexual glands, thyroid gland, bones, pituitary, and so on. As is the case with the chemical carcinogens, the hormones give rise to tumours only in some animals. What is presumably essential is the original background, the condition of the liver, the characteristic features of metabolism, among other things. Even if malignant tumours had developed in patients at young age, some

features of intense senility were determined in accordance with certain regularities. The well-known Soviet endocrinologist and oncologist Professor V.M. Dilman discovered a coincidence in the characteristics of metabolism typical of normal senescence (ageing) with the changed conditions of chemical carcinogens. In the first place what we have in mind here is the insufficient utilization of glucose and the preponderant use of fatty acids as the source of energy. The redundancy of cholesterol, triglycerides, some of the lipoproteins and insulin, which is quite natural under these circumstances, promotes the division of both the normal and tumoral cells, introducing a discord in the condition of cellular immunity.

These circumstances made it possible to refer senescence to the important factors of carcinogenesis, while cancer, to use the terminology introduced by Dilman, may well be linked to the ten "normal diseases" associated with old age.

The given data enable us to furnish some kind of explanation why malignant tumours are found more frequently in people advanced in age. It is a known fact that with age the number of cancer patients becomes several times greater. What conditions this is the possibility of previously mentioned endogenous (internal) carcinogens and the continuity of the effect of exogenous (external) carcinogenic factors.

It turns out that we are "surrounded" with enemies from the outside and inside. However, cancer is not that frequent a disease. Though a great many people inhabit the very same "carcinogenic ocean" their quiet lives are not disrupted by any malignant tumours.

This state of things was picturesquely described by the American writer B. Glems-  
ser—sometimes it seems more appropriate to say that only few of us are fortunate enough to survive in this carcinogenic ocean. When we try to imagine the causes that could bring about this malignant disease, the impression is that there is but one way to avoid cancer: stop breathing (air pollution can have a carcinogenic effect), stop eating (some food products are found to be carcinogenic, while in a large number of others there are traces of carcinogens), and never to step over the threshold of one's own house (on account of the viruses, which, as it might some day be proved, are the actual cause of all this)...

The study of carcinogens in the environment and in the very organism of man and animals is so far successful, a fact of enormous social significance.

The avalanche of new compounds that have emerged in the twentieth century must be checked most thoroughly. We should learn to determine which of them is directly or indirectly hazardous and thus exclude it from everyday use.

Therefore, it is not by chance that in the Constitution of the USSR we read that "in the interests of the present and future generations special measures have been taken in the Soviet Union directed at the protection and scientifically based, rational use of the earth and its depths, water resources, the vegetable and animal kingdoms, the preservation of air and water in a purified state, the maintenance of the reproduction of natural wealth and the improvement of the people's environment." A highly important and opportune decree was adopted by the legislative establishment of state control (special inspections) for the daily observation of the maintenance of measures connected with protection of the environment. Questions pertaining to its recuperation are now discussed on an international scale.

This is a very good example of how seemingly theoretical observation and research acquire a definite practicality and give rise to the necessary prerequisites for protecting people's health. Immediately following the theory of chemical exo- and endogenous carcinogenesis is what is called viral carcinogenesis. Its inception is associated with the name of the prominent Soviet scientist Lev Silber.

These days nobody has any doubts that viruses are able to bring about a great number of malignant tumours in experimental animals, including apes. From the point of

view of oncovirusologists, the variety of tumours in the animal kingdom can be divided into two groups: neoplasms, the viral nature of which has already been proved, and neoplasms which still await verification. It is noteworthy that with each year the range of tumours of viral origin expands. The exceptions include tumours in man—the area in which it is possible to speak only of some "candidates" to oncological viruses. In the first place what we have in mind are the so-called adenoviruses, which nestle in the tonsils and give rise to colds; they cause tumours when introduced into experimental animals. This fact makes one stop and think, but does not yet substantiate the viral etiology of tumours in man. Direct evidence could be obtained only on "a human model". In addition, it should be mentioned that from the moment of infusing the tumour-producing virus to the inception of the disease, it usually takes one half or two-thirds of an animal's lifetime. If this were correlated with the span of human life, we should see that it would be necessary to wait years and years even if there were volunteers ready to check the viral theory on themselves.

Difficulties connected with methods (and not only with methods alone) make scientists look for other ways of conducting research.

It has been many years already in the Sukhumi's monkey nursery that the viral

nature of leucoses (a malignant disease of the blood) has been studied under the scientific guidance of Academician B.A. Lapin of the USSR Academy of Medical Sciences. No evidence has yet been found that verifies the identical character of the disease, or conditioning role of viruses, of man and his closest relative the ape.

There is reason to assume that at the present moment the most undisputed candidate in the oncogenic viruses of man is the filterable agent which generates Burkitt's lymphoma. This virus is found to be in the group which includes the widespread causative agent of "fever" in man: lips covered with watery blisters, which then dry and form crusts, which remain for a long time. Herpetic fever often accompanies a cold.

Burkitt's lymphoma is a disease of the lymphatic system in the neck. The tumour usually affects children between 2 and 14 years of age, and as a rule, it ends in the death of the child. We speak of it now in the past tense since Burkitt's lymphoma refers to those tumours for which medical treatment is nowadays almost one hundred per cent effective.

The history of this disease is connected with the name Dennis Burkitt, an English surgeon, who worked in Uganda. He made the discovery already a middle-aged man (nearly 50 at the time).

On the basis of a questionnaire which he distributed among his colleagues he

managed to find out that the tumour was not characteristic of all the regions in Africa. He decided to mark the zone of its propagation in a way similar to what the ornithologists do when they make maps of bird settlement.

Driving an old Ford, with two assistants, Burkitt went on a safari "hunting the tumour", as he used to say.

The result—for the first time in the history of medicine a malignant tumour was discovered whose "progress" depended on the temperature and humidity of the air. It was possible to assume that the disease was transmitted by the mosquitoes, and since they are known to be the carriers of infectious agents, the virusologists began to be looking for the causative agent of lymphoma.

Gradually data accumulated which showed that the lymphoma described by Burkitt proved to be rare in climatic conditions which exclude the possibility of the existence of any kind of carrier. The "participation" of mosquitoes had to be turned down as an untenable idea, but these insects did give the researchers the impetus to start their quest of the virus. It was called EB after the names of the English scientists Michael Epstein and Y. Barr, who had singled it out. After a certain period of time Americans Gertrude and Werner Henle discovered a very interesting fact: EB proved capable of causing the common benign ill-

ness of the lymphatic system—*infectious mononucleosis*.

It was difficult for the first pathologists studying mononucleosis to distinguish it from leucosis. Meanwhile this disease, distinct from oncological ones, invariably leads itself to treatment.

Thus, one and the same virus can in some cases be the cause of a malignant tumour, while in others it becomes responsible for an infectious disease.

As is known, viruses are intracellular parasites: the generation they produce develops at the expense of the chemical elements in the cell. Having penetrated into the nucleus, the virus introduces into it its own hereditary system, which competes with the complex hereditary system of the cell.

In the form of a diagram the conflict between the genetic information of the virus and the cell can be represented by three variants. If the virus has a dominant position, it begins to rapidly reproduce itself, and from the inside, as it were, explodes the cell. If the cell proves to be stronger, the viral particles remain without progeny. Lastly, there exists a "compromising" variant: the amalgamation of the genetic material of the virus and of the cell. According to Silber's theory, it is precisely this kind of integration of two genomes that conditions the emergence of a malignant transformation.

By observing experimental tumours, Silber discovered a phenomenon pertinent to the disappearance of a tumour-generating virus from a cancerous cell. He put forth the idea that the virus, having provided every opportunity for changes in the hereditary system of the cell, can disappear since in its full (infectious) form it is no longer required for the maintenance of the process: in the case of each subsequent division of the cell the "cancerous" genes of the virus, which had entered its genome, also reproduce and are transmitted into daughter cells. Silber's virogenetic theory gave a marked impulse to the development of experimental oncology.

However, this theory had one vulnerable spot: most of the oncogenic viruses of animals according to the type of the structure of their nucleic acids are of RNA content, whereas the genome of the cell represents DNA. The "union" of RNA and DNA is, in principle, impossible.

This contradiction was eliminated when the American biochemist G. Temin and his colleague S. Mizutani found in the content of viral particles a special enzyme which helped to build DNA on the matrix of an RNA virus. This newly created DNA is found to be exactly what integrates with the DNA of the cell.

But by no means do such "encounters" of the virus with the cell end with infection, a tumour or the decay of the intruder. Sil-

ber warned that the tumour-generating virus could exist in a passive state and that a certain additional factor (for instance, a carcinogenic substance) is required to activate it.

Further research served as evidence that the integration of hereditary apparatus of the virus with the DNA of the cell as such was insufficient for malignant transformation: there are at least two forms of integration—normal and pathological. Moreover, according to modern views that were first formulated by the American biologist Hübner, the viral genome (virogene) is present in all the cells. This is of particular biological significance: the virus not only can destroy so as to survive itself, but it can also manage to co-exist. As a result of thousands of years of evolution, the virogene rooted itself in the cells of vertebrates. Those of the extreme viewpoint in biology go so far as to think that the virus in these cells plays no small role in physiological function. However, under the influence of carcinogenic substances, irradiation or natural senescence the virogene can transform into an active source of the tumoral process.

This is exactly where the link-up between the virogenetic theory, with the concepts of chemical and physical carcinogenesis, is often determined. According to contemporary views, cells contain different kinds of viruses. They are found to be in a state of bio-

logical equilibrium with the cell and the organism as a whole, and nothing detrimental takes place as long as the said equilibrium is not disturbed. The cell and the virus constantly undergo the effect of various factors of the external and internal medium: they are the exo- and endogenous chemical and physical blastomogenes, such as radiation or ultraviolet rays. Under particular circumstances the factors start manifesting themselves, the virus acquires its aggressive property and penetrates into the genome of the cell, which leads to a number of pathological conditions that may include the decay of the cell, oncogenic effect and so on.

It is in the case of this oncogenic effect that there appear new hereditary properties as a result of the disarrangement of the genetic system of the cell—unremitting reproduction, incomplete maturation, the loss of contact with “neighbours”. The processes of metabolism are altered, the cell produces antigenes, and the organism begins to react to it as if it were both alien and hazardous. The immune reaction starts to function. Because of the rise in immune tension the cell that is dangerous for the organism dies and no tumour emerges. This kind of struggle, one should imagine, occurs constantly. The older the organism the more probable “juxtapositions” of this kind are expected in different organs.

However, if an activized virus intrudes into

the genome of the cell, which is in a medium practically inaccessible to the immune forces of the organism, or the immune tension itself is weak and cannot overcome the hazardous reaction in the stage of its inception, the cell or group of cells can reproduce and continue to metastasize without any hindrance.

This seemingly well-balanced theory has one deficiency. For the manifestation of antigenic properties it is required of the cell to have particular biochemical distinctions from the original cell. Otherwise the immune systems of the organism cannot identify it as "alien".

Thus, the viral theory, though based on cogent factual material, as it were, is not devoid of controversy. On the one hand, viruses most definitely participate in carcinogenesis with some animals. On the other hand, they constantly take part in the everyday life of each cell, which is exactly why we cannot unconditionally recognize viruses as the only factor giving rise to malignant tumours. This kind of contradiction gives impetus to further research, an in-depth study of the place of viruses in complex biological processes, which lead to the transformation of the normal cell into the cancerous one.

If until now the development of experimental oncology has been wholly dependent on the progress of general biology, and the possibilities of utilizing biological methods

for special oncological purposes, the functions have recently changed places—the methods and means of experimental oncology can be of great help to biology, molecular biology in particular. That is why research in the field of virusology, genetics and virogenetic concepts of carcinogenesis are of no minor importance for biological science.

As far as the viral theory is concerned, it has actually brought its positions closer to the polyetiological theory put forward by Nikolai Petrov some sixty years ago.

Its substance boils down to the fact that owing to various circumstances there appears a new "breed" of cells, which are distinguished by the ability to divide wantonly. When translated into the language of biologists it is formulated in the following manner: "Any impact, inducing the transformation of cells and causing the weakening of factors that hinder their reproduction, can in the long run be the reason which conditions the emergence of a cancerous tumour."

This is where the most important component of carcinogenesis is implied, which has only been mentioned so far. What we have in mind here is the struggle of the organism itself against the tumour. A large amount of information has already been collected and there are quite a few interesting ideas in this respect. Many of the concepts that have been advanced are fairly

well substantiated and claim to be of universal character, which, in our opinion, is their main fallacy.

A certain scientist said that a hypothesis refuted by the new facts dies a noble death. The accumulation of factual material suggests an unavoidable transition of quantity into quality. There can hardly be any doubt that the time will come soon when an integrating theory of cancer will be generated.

However, we cannot but admit that no generalizing theory has as yet been created. So far nearly every scientist who has achieved some results considers his trend "to be exactly it". The way this scientist proclaims his position depends entirely on his scientific conscientiousness. Those less modest usually raise their voice to the highest pitch and announce that the problem of cancer has been solved; those who are more modest merely state that they have created a comprehensive and integrating theory.

In the history of oncological studies such statements can be found "...it is difficult to assume in the long run that processes leading to identical changes of a cell should in one case be brought about by the change of one's own genetic material, while in the other case by the introduction of additional genetic material, which the cell (through a virus) acquires from the outside". It follows then that if there are no other immediate variations on the theme then you

are bound to accept one point of view only.

Science is applauded by people and everyone wants to be worthy of a gold monument, which, according to the myth, will be erected to the man who conquers cancer.

The possibility cannot be excluded that people will have to erect the gold monument to the computer, especially if we take into account the innumerable and rapidly accumulating experimental data and clinical observations. In their time Süss, Kinsel, and Scribner made an attempt to formulate the problem of cancer on the computer. As far as I know, mathematicians did not support this idea.

It is interesting in that it fairly adequately sums up what is already known about the development of tumours. Each tumour passes through three stages: transformation, activation, and progression. Transformation (the malignant conversion of the cell) can appear as a result of many factors: the impact of a chemical or physical carcinogen, a virus, etc. Take, for example, a chemical carcinogen, which encounters a normal cell and penetrates into it. The protective mechanisms on the cellular level (enzymes) can dissect and extract the carcinogen. This is most often the case. Sometimes the carcinogen manages to interact with the DNA of the cell nucleus (hereditary material). What we can also see here is the reverse development of the process if we have

intrusion of enzymes—"cleaners", or repair enzymes. If, however, this does not take place, the cell is transformed. It is not yet a tumour, but only its prerequisite.

The stage of activation is next. The transformed cell begins to multiply and, if it does manage to "slip away" from regulated division on the part of the organism (connections with other cells are disrupted, and inhibition signals are not perceived), the pathological clone is formed. The growth of this clone is also confronted with a number of obstacles, the most important of which can presumably find its expression in immune protection. When it does not "work", the transformed cell can become tumoral. One can see that a malignant tumour has quite a few hindrances in its way! And this is precisely what makes cancer a comparatively rare disease.

The next stage is that of progression. Under the influence of the reaction of surrounding tissues, hormones, and many other factors the formation of the tumour takes place which penetrates into the neighbouring organs and produces metastases.

Besides, this course of events predetermines the effect of local impacts in the early stages of cancer and the necessity of employing general methods when the tumour grows.

The multitude of factors capable of bringing about the malignant transformation of cells considerably diminishes the hope to

discover a single cause and a speedy elaboration of causal treatment. However, whole wealth of the knowledge that the oncologists have at their disposal today makes it possible to rationally take prophylactic measures and successfully treat people who have contracted malignant tumours.

It is necessary to point out that every single scientific achievement takes practically no time to be realized in concrete prophylactic, diagnostic and medicinal measures. The myth about the impotence of man in his struggle against malignant neoplasms is still going strong in spite of all our efforts, but it is based on obsolete concepts and should be made extinct. What can serve as an obvious refutation of this myth is that there are many millions of people who have been cured of cancer in the world.

### **The Organism' in Defence**

The third question on our questionnaire was: "Will the tumoral antigens that are typical only of cancer be discovered?" Ten years ago this question would have sounded "heretical" since it was the period of if not altogether of triumph, then at least the development of immunological research in oncology. Reflecting the dominant views at that time, Boris Shubin and I wrote that the immunological discoveries were one of the most prominent achievements in theoretical oncology of recent years, although

this was possible in the minds of a large number of researchers as far back as the beginning of the century. In 1978 there was seemingly a whole network of evidence substantiating the importance of protective immunological mechanisms in the development and progression of tumours. There took place, and it continues to take place now, attempts to use immunological methods for the diagnosis, treatment and even prophylaxis of cancer. Here are some of the examples.

The diagnosis of tumours of the liver using conventional and X-ray methods is very difficult. The identification of early forms, particularly if the tumoral node is situated somewhere in the centre or on the posterior surface of the organ, is practically impossible.

For a long time the biochemist Yurii Tatarinov had studied antigens in the blood serum of the human fetus. By applying sophisticated biochemical and electrochemical methods, he succeeded in specifying three particular antigenic components that are distinguished by their mobility in the electric field. In another laboratory, headed by the immunologist G.I. Abelev, it was established that one of the components of the serum of the fetus (ESP-glycoprotein) was identical to the glycoprotein which had previously been found by Tatarinov in the blood of patients suffering from cancer of the liver. The joint efforts of both laboratories made it possible to prove that the serum of

healthy adults did not contain these substances but that they were characteristic of a certain form (hepatocellular) of cancer of the liver. The discovery of Abelev and Tatarinov was tested and verified in the USSR and also, according to the World Health Organization, in some countries of Africa, where cancer of the liver is found fairly often. The results show the high authenticity of the test. This discovery does not only have practical significance, but that the actual possibility of utilizing the immunological method in the diagnosis of malignant tumours has been substantiated.

Nevertheless it is necessary to emphasize that the regularities discovered in the experiments with animals cannot just be transposed into the system of views held by the oncologist whose wide scope of activities includes daily contact with patients with either cancer of the stomach, oesophagus, mammary glands, or many other organs. Each of these diseases is specific and varied in its manifestations and probably in its origin too. To illustrate this point we can take cancer of the breast as an example. It seems to be but a single illness. However, there are numerous data which serve as evidence that cancer of the breast takes a variety of forms that are distinct from one another as far as the course of illness and its prognostication are concerned.

This example shows how difficult it is to make specific statements in the field of

But as of yet the tumoral antigen remains undiscovered; at least in the tumours of organic origin of man. It cannot be but mentioned, however, that news concerning the discovery of this kind of specific tumoral antigen has appeared time and again. If it were actually the case, then the immunoprophylaxis and immunotherapy of tumours would become quite possible in exactly the same way as the prophylaxis and treatment of infectious diseases, where microbe antigens are the reality.

In 1969 Soviet researcher V.V. Gorodilova published the results of her ten-year observations of two groups of patients who had breast cancer, one of which, besides the usual combined form of treatment, was also vaccinated. Mortality in this group was twice as low than in the other group. However, this experiment has not been substantiated by anyone else and we have no evidence whatsoever that a specific anti-tumoral vaccination of people can be possible at all. George Mathé—the outstanding French oncologist and immunologist wrote: "All that little information concerning human tumours that we have now at our disposal proves to be excessively difficult for interpretation ..." We can only assume that for some of the tumours one or several antigens have already been discovered or **are being regarded as such** (emphasized by the author).

Giving due credit to the enormous amount

of work that has been contributed to the problem of the immunology of tumours, I want to not just warn my readers against any ebullient optimism, but show the true place of this problem in the most complicated conglomeration of facts, hypotheses and myths that is called oncology.

Whether we speak of viral carcinogenesis, the significance of hormones, or the immunology of tumours, what strikes the eye is a general feature: although there are individual cogent facts and well-balanced theoretical assumptions, it is quite clear that the course of processes is **not always** the same and that the theory is tenable only for the greater (more often the smaller) part of observations.

It is precisely here that we encounter the main difficulty in studying the origin and development of malignant tumours already mentioned on several occasions, which are highly varied and are brought together by a sole general feature—the presence of wanton growth. In all other respects tumours are quite different and, what is also probable, are of diverse origin.

Particularly noticeable are the distinctions between solid tumours and systemic malignant illnesses. When analyzing the work of competent immunologists and virologists one cannot but help pay attention to the fact that most clinical observations and experiments connected with animals refer not to the most frequently occurring malig-

nant tumours of epithelial origin (*carcinoma in situ*) in people, but to the malignant diseases of the blood and the haematopoietic tissue, as well as to sarcomas, whose origin goes back to connective tissue.

The intensive research of immunological mechanisms, although undoubtedly important and attracting no minor cognitive and general biological interest, to a certain extent prevents us from visualizing the pattern of anti-tumoral protection of the organism on the whole. The words of the poet Esenin readily come to mind: "We do not see the face when face to face, for we can see great things from afar."

Over the past two decades the scope of scientific knowledge has greatly expanded.

The prominent Australian immunologist Barnett presented the theory that immunological self-recognition is a derivative of the process that permits the maintenance of morphological and functional unity in large and long-living multicellular organisms.

Scientists found it insufficient to know just that antigens in the organism are confronted with the antibodies that are meant to destroy or to drive away an uninvited agent. After studying the problem, interesting details were discovered.

The stability of the inner medium of the organism is maintained by protection from infection and its "own enemies"—the cells in which the antigenic properties have un-

dergone some changes under the influence of various factors, including those that result from exposure to radiation, chemical substances and viruses.

For this purpose the organism should possess structural elements that are capable of distinguishing "native" from "alien", and eliminating the latter. This function is performed by the lymphoid cells.

It was known earlier that antibodies are formed by plasma cells, and that the immune lymphocytes have a particular task which consists in ridding the organism of "new-comers". Scientists succeeded in penetrating into the mysteries of the unusually complex multistage cellular transformations and interrelations. A new science was born which so far has the following cardinal facts at its disposal.

Lymphocytes, the small cells each with a massive nucleus, which are permanently contained in the blood, are by no means homogeneous as far as their functional properties are concerned. They are "supplied" by different components of the haemopoietic system: the bone marrow, the lymph nodes, the spleen, and lastly, the thymus gland, which is located behind the breast bone. In small lymphocytes, formed in the bone marrow, sensitive parts of the membranes (receptors) were discovered. They are the first to come in contact with and recognize alien antigens. The process of identification is the starting block for the transfor-

mation of these cells (called B-cells) into plasmocytes, which produce antibodies. However, they themselves cannot do anything without the other lymphocytes formed in the thymus gland (hence the term T-lymphocytes). This is a kind of "insurance system".

Gradually scientists became convinced that these two systems are not homogeneous either, that there are quite a few smaller subdivisions, the number of which increases in the course of the immunological reaction. There exist helper cells and killer cells, etc., down to the system of remote control (those responsible are active substances circulating in the tissue fluids of the organism). Furthermore, B-lymphocytes and T-lymphocytes do not only "insure" each other but divide the functions. B-lymphocytes are responsible for all variants of the immune response, but are controlled by T-lymphocytes and other mechanisms, while T-lymphocytes struggle against the antigens of tissue incompatibility in the course of the transplantation of tissues and organs, as well as against "internal enemies" (an expression coined by the Soviet scientists B.D. Brondz and O.V. Rokhlin) — their own cells which have undergone marked changes under certain external influences.

It is noteworthy that the formation of these cells is suspected by a large number of scientists to be controlled by a number of hereditary genes. Thus, immu-

nology borders on another science—that of genetics. New and genuinely indiscernible horizons of scientific quests are opening up.

And yet the futility of such quests by means of a single integrating theory becomes no less obvious at the given stage of scientific development.

The question can be raised: What is it about the mystery enshrouding the origin of cancer that interests us so much? Well, the only thing we can say is that today immunology is the domineering aspect of theoretical oncology.

By the number of those who adhere to this theory and the range of experiments directed at the investigation of immunological details, the place of immunology in science is historically comparable with Rudolph Virchow's stimulation theory. Academician R.E. Kavetsky wrote: "...After the classic works of L.A. Silber, G.I. Abelev, Morton, Klein and many others, nobody doubts these days the existence of antigenic distinctions between tumoral and corresponding normal cells. If antigenic differences do exist, there must also appear some immunological inspection in the form of certain humoral and cellular reactions."

Virchow claimed that no one, even if placed under torture, could ever say what cancer cell actually was; however, Süss, Kinsel and Scribner in their book on cancer attempted to give a tentative definition

stating that, in the simplest case, a cell can be regarded tumoral if it divides more often than its neighbouring cells. But frequent division does not yet allow the organism to regard the cell as "alien" and to interfere into intracellular phenomena. The authors also assert that it is believed that the immune defence system of the host begins to act only when tumoral cells are already there... No one has any doubt that to understand how tumoral cells originate, it is necessary to study the immune reactions.

The contradiction, although they try to circumvent it most carefully, is evident.

Meanwhile the question of what is primary—the tumoral growth or immunological reaction—remains principal for the fate of oncological studies. If immunodepression is primary, then the research of the immunology of tumours can be conducive to the solution of the problem and the elaboration of preventive measures. If, however, it is just the opposite, then the immunological untenability of oncological patients and animals with malignant neoplasms can have no greater significance than the presence of leucocytosis and a high ESR, which are characteristic of inflammatory diseases, but do not explain their essence.

There is a large amount of data supporting the two viewpoints.

As far back as 1972 Leningrad scientists F.V. Ballyuzek and V.I. Pechersky wrote:

"The indisputable advantage of the immunological concept of carcinogenesis is its integrating property regarding all previous scientific hypotheses which interpret the regularities of tumoral growth." This assumption originated from their attempt to generalize. Süss, Kinsel and Scribner have sceptically noted that there is not a single science that can do without hastily made statements and prejudices, oncology is by no means an exception. With its wide scope of observations, remarkably separate from each other, it is more than any other science in drastic need of some spurious though cogent hypothesis so as to pave at least some kind of path through the impenetrable jungle of yet non-correlated facts and ideas.

At present we have a sufficient number of facts that allow us to assert that the cells of malignant neoplasms originate from normal cells and through a whole range of features remain, as it were, the diseased organism's own cells. But there exists a different view on this subject too.

The proponents of the immunological theory of cancer tend to assume that tumoral cells continuously appear in the organism. The cells are identified by the immune system as "alien" and are destroyed by the usual rejection reaction, i.e. the same reaction that does not "accept" an alien organ in transplantation.

To get to the bottom of this phenomenon

it became necessary to investigate whether the tumoral cells have any distinctions which maintain the immunological response of the organism.

As far back as the beginning of the 1970s it seemed that there had to be a certain biochemical substance that determined tumoral properties. Why couldn't it actually be a specific antigen?

However, the experimentors possess facts which prove that there also exist "antigenless" tumours, as well as those whose antigenic properties have been lost in the course of time, although they themselves do not cease to be malignant.

Soviet oncologist and experimentor A.I. Ageyenko considers that the immunological changes accompanying malignancy (the transformation of an originally normal cell into a cancerous one) are the most subtle reflection of biochemical shifts in the cell. In other words, the immunological changes are a consequence, not a cause, of transformation, while the marked distinctions between normal and tumoral cells find their expression only in uncontrollable division of tumoral cells, which can be explained by characteristic features of their membranes.

An example from an altogether different field of human activity could serve to illustrate the case in point. Imagine that you are driving a car in which the brakes function quite adequately. All of a sudden air

gets into the brake system. An experienced driver will immediately grasp the hand brake and switch to a lower gear. However, a driver lacking in appropriate experience will not be able to slow the car, and it will continue to speed on without aim or direction. Tumoral cells also lose contact with inhibiting systems and multiply without any special need for the organism, bringing harm to it, although, in principle, containing the same biological structure as healthy cells.

But let us return to our example: the uncontrollable automobile has exactly the same construction and the same defect as the one that can be controlled. But it is the absence of control that leads to an accident.

The ideas above make it possible to assume that the cell that has already been transformed does not have sufficient possibility to acquire the specific antigenic properties.

Thus, the emergence of immunological changes is the effect and not the cause of transformation.

Ten years ago, when answering our questionnaire Professor V.S. Shapot wrote: "Even now it is possible to give a negative answer to this question. The most prominent immunologists and oncologists have become convinced that all the so-called tumoral-specific antigens of a human being are of embryonic origin, i.e. characteristic of a normal organism which produces them

in the early period of ontogeny. This is nothing surprising since up till now, in spite of the achievements made in the analytical chemistry of proteins, not a single specific protein, enzyme or product of enzymic reaction has been found that would be able to form cells of a normal organism, at least be distinct from the tumour by its histogenesis."

Time has shown that Shapot was absolutely right. Hence, it should be regarded that the immunological factors in the development of a tumour do not play any decisive role. Boris Shubin and I wrote: "Immunology will gradually take the place of one of the blocks in the multistoried edifice of the general theory pertaining to the emergence and growth of malignant tumours."

Construction is still in progress.

It goes without saying that immunological thinking in oncology is highly important, serious and useful, although this does not mean that all other hypotheses and facts are subservient.

## Chapter Two

# Achievements of Oncological Studies

### Organization, Organization and Once More Organization

The great achievements in the field of oncology in the USSR include the orderly, extremely effective and constantly improving system of the struggle against malignant tumours.

In April 1945, when the guns of the World War II had not yet ceased to fire, when it still remained to heal the wounds inflicted by the war and reconstruct the cities and villages destroyed by the enemy, the Council of Peoples Commissars of the USSR issued a special decree, "On measures for improving oncological aid to the population", and among its goals was to expand the network of oncological institutions for the prevention and cure of cancer.

It was highly significant that in a large number of regional towns military hospitals were reorganized into oncological dispensaries. Taking this consideration, we have allowed ourselves to touch upon some of the events referring to military medicine.

One of reasons for the victory of the Soviet Union over fascism was the unprecedented recuperation of the wounded. Even in the first and most difficult period of the war, when the Soviet armed forces were barely holding the line and the country, hav-

ing lost territories that were most important for national economy, experienced enormous and, at times, critical hardships. Recovery of the wounded in the USSR could hardly be compared with the recovery of the wounded in the enemy's army, even though Hitler's forces at that time were far better equipped with transport facilities and medicine, and German surgeons were traditionally regarded as the most proficient in Europe. Why then was this so? The answer lies in the principles of organization and in the military and medical doctrine itself.

The Russian, then Soviet military and medical doctrine had been created over the course of many years, beginning with the Crimean war. At its source was the famous surgeon Nikolai Pirogov. Its essence consists in sorting out and evacuating the wounded according to designation, as well as maximum correlation of qualified medical aid with the types of military units.

For instance, it is known that in case of abdomen wounds the prospects of recovery become markedly greater if the rescue operations are conducted within the very first six hours. Procrastination is as dangerous as death itself. Hence, those with abdomen wounds were "sorted" already in the regimental medical unit, that is at approximately a kilometre from military activity, then they were speedily evacuated to the nearest medical corps battalion (no fur-

ther than 6-7 kilometres away), where a special team of doctors concentrated on these operations only.

The German military and field doctrine, as well as the medical one, was adjusted to the idea of "blitzkrieg". As far as this idea justified itself, the wounded were not confronted with any unpleasant consequences. During the battles in Belgium and in France practically all military personnel seriously wounded were immediately transported by planes to the largest hospitals and clinics in central Germany. Return to active military service was very high.

Things changed radically when the fascists invaded the USSR. "Blitzkrieg" was entirely discredited by the courageous resistance of the Soviet people. There seemed to be no end to war; communications were prolonged, the number of the wounded began to grow at such a rate that no means of transportation was adequate. There could be no question of evacuating all those in need of surgery to the rear. The enemy was compelled to hastily reorganize the military and medical service and losses were on the increase not only at the expense of the growing number of the wounded, but also because of the inopportune rendering of qualified surgical aid.

Thus, the Soviet military and medical doctrine defeated the Hitlerite doctrine and proved to be one of the factors in the great victory of the Soviet people.

The question may well be asked: Isn't this all a digression from the subject that is being discussed in this book? The answer is a most emphatic "No"!

The victory over each of the mass diseases begins with organization. Tuberculosis and malaria can serve as examples. There was a time when consumption was a merciless scourge and caused no less concern than the present-day oncological diseases. It became possible to harness tuberculosis in earnest only by creating a network of anti-tuberculosis dispensaries.

Malaria was widespread too. In 1938 the number of victims in the world reached 170 million people, while the annual mortality rate was approximately 3.5 million. Thus, it proved to be more dangerous than the plague and cholera together!

In the Soviet Union 660 anti-malaria stations were organized and twice as many anti-malaria posts. Energetic anti-malaria measures that were undertaken in the pre-war years yielded impressive results: instead of 10 million people who were registered as malaria patients in old Russia, the number fell to 1.5-2 million in 1938, and today cases of this kind are rare.

In order that we successfully cope with any mass diseases of the population there should be a collection of principles, laws, instructions, i.e. a particular scientifically based doctrine, which is needed to carry on any effective anti-cancer struggle.

The oncological doctrine is generally composed of two equally important components: the first consisting in the opportune discovery of the illness and the second finding its expression in adequate treatment with characteristic features of the tumour and the patient's organism taken into account. However, a doctrine alone, without a corresponding system to maintain it, is a word devoid of any meaning. Considering the significance and current importance of the problem connected with the struggle against malignant neoplasms, the Soviet government constantly widens and strengthens the network of oncological establishments. Particular attention is paid to the creation of large multi-functional dispensaries, equipped with up-to-date diagnostic facilities, powerful gamma-therapeutic installation and such means that provide every opportunity to carry out the most complicated surgical operations.

Today the Soviet Union has a well-balanced system of medical service for oncological patients. All work along these lines falls under the auspices of the Department of Oncology of the USSR Ministry of Health. The research is coordinated and directed by the Scientific Council responsible for the studies in malignant neoplasms at the USSR Academy of Medical Sciences. Academician Nikolai Blokhin, Chairman of the Council, also heads the USSR Oncological

Scientific Centre of the Academy of Medical Sciences of the USSR.

New buildings in Leningrad accommodate the departments and laboratories of Petrov Oncological Institute. Each of the union republics has its own centre for the consultation and treatment of oncological patients, which is represented by the republic research institute. Special sections of these institutes organize and control the activity of oncological subsections in the province.

In all regional centres oncological dispensaries have been organized. Each of such centres has a polyclinic and facilities for treating in-patients and where advice on organization and methods of treatment are available. Many of the large dispensary clinics also function as teaching hospitals for medical colleges, where specialists are trained.

In the past few years society has been confronted with the task of returning oncological patients to work and enabling them to function socially again. It is necessary not only to restore the physical ability to work, but also to do the same for the state of mind of these traumatized people. Rehabilitation involves oncologists as well as psychologists, sociologists, economists and those connected with social security. It should also be mentioned that the return of many thousands of people who have been cured of cancer to normal activity is of enor-

mous moral significance and promises no little economic effect to society itself.

At present there are 21 oncological and X-ray and radiological institutes in the USSR, together with 248 oncological dispensaries, 3,376 oncological departments and offices, and over 55,000 beds for oncological in-patients.

The socialist countries widely employ the organization principles that have formed the basis of Soviet oncological service. Without copying it, they have creatively developed it further in accordance with their medical traditions, state, geographical and other peculiarities. What hampers an anti-cancer struggle in the West is the deficiency of a general public health system.

The remarkable French oncologist, former Deputy Minister of Health, Professor P.V. Denois once related that what presents considerable difficulties is the fact that medical institutions in his country belong to either the state or to private owners. A large number of private doctors now have their own offices where they use radiotherapy but attach too great an importance to it. They violate the principle of combining various methods, such as surgical, radio- and drug therapy, which are so essential in treating certain forms of cancer.

In Great Britain there are individual, specialized oncological centres, but many of the patients are obliged to receive treatment in establishments that are insuffi-

ciently equipped and are not concerned with any particular kind of cancer.

The World Health Organization (WHO) has been interested in oncology since the time of its inception. It should be mentioned that in the first ten years after the World War II, oncology held only the sixth place on the list of problems to solve which were most vital for mankind, and it was only after 1958 that oncology joined the foremost ranks together with cardiovascular diseases.

For the quickest way to rid people from cancerous diseases it is urgently necessary that the world wide research should be united. This is the goal of the International Union Against Cancer in which Soviet oncologists are taking a most active part.

The Soviet Union is a member of the International Agency for Research on Cancer which has its headquarters in Lyons. In addition, oncologists of the socialist countries have developed a comprehensive joint programme within the framework of the Council for Mutual Economic Aid. On the other hand, on the basis of inter-governmental agreements between the USSR and a number of western states, integral programmes on some of the questions of oncology have been formed. The collective endeavours of scientists will certainly bring even closer the day of victory over malignant tumours.

All efforts of the organizers of health

protection, doctors and their assistants, who have taken part in the early diagnostics, as well as the oncological surgeons, specialists in chemo- and radiotherapy, endocrinologists, and immunologists produce the fruits of their labour. In the USSR we have approximately two million people who have been cured of cancer. Half of them have survived for more than 10 years.

It would not be out of place to remind the readers that prior to 1900 oncology had no cases where recuperation of patients from malignant tumours was a sure thing.

Etched in the memory of the older generation of doctors is how they could do no more than comfort the cancer patient, or at most prolong his or her life for a short period of time. Now it is possible to save those people who have only recently been regarded as hopeless. The general progressive trend in oncology is encouraging, and we cannot but share the opinion of the Nobel Prize winner Peter Medawar, who is convinced that the heroic events of today are a part of the ordinary medical aid of tomorrow.

Oncology as a science began with the registration of patients. For a considerable period of time the number of cancer patients was equal to that of the deceased, and the only source of information regarding the spread of malignant tumours was statistics concerning mortality. Now, however, the death rate resulting from these diseases has

significantly decreased, which gives us the right to say that we are witnessing the formation of statistics on the survival rate in cases of cancer.

The realization of the Soviet oncological doctrine is carried out by all medical personnel throughout the whole country. The leading role in organization and propagation of methods belongs to oncologists.

### **Prophylaxis of Cancer**

The first stage in the anti-cancerous struggle is the so-called initial prophylaxis of cancer. It consists of eliminating from man's environment the physical and chemical factors that are conducive to the development of cancer (carcinogenic factors), as well as the struggle against such dangerous habits as smoking and alcoholism. More substantial prophylactic measures will become possible when the origin of cancer comes to light.

Since the author of the present book is a surgeon, he finds it his duty to expound the principle with the most important part of the initial prophylaxis of cancer by using materials from Professor A.V. Chaklin's latest book, in which he writes that the fundamental tasks of the hygienists consist not only in standardizing the content of carcinogens in the environment, but also in eliminating the very possibility of their formation and influence upon man. Their

ultimate permissible concentrations should be reduced to naught.

In the USSR, standardization of hazardous factors in the environment began to develop after the Great October Socialist Revolution. Unlike most of the capitalist countries, the Soviet Union has worked out, among other things, standards and inventories of the ultimate permissible levels (UPL) and the ultimate permissible concentrations (UPC) of hazardous factors. They are important sanitary legislations that are constantly amended in connection with further development of chemistry and physics.

The Committee concerned with carcinogenic substances and prophylactic measures at the main office of Statistics of the USSR Ministry of Health and the Problem Commission dealing with the epidemiology of malignant tumours at the Scientific Council for Malignant Neoplasms of the Academy of Medical Sciences of the USSR have discussed questions pertaining to the epidemiology and genesis of the carcinoma of the stomach. It was revealed that in food products there could be carcinogenic substances in the form of various additives: dyes, substitutes, remains of pesticides, compounds from packing, or the results of the synthesis of products in the process of drying, roasting, smoking and other technological processes. Nowadays it is difficult to say whether these substances directly affect

the mucous membrane of the gastro-intestinal tract. In a number of cases the experiment shows the emergence of chronic diseases and tumours of other organs when carcinogenic substances are introduced into the digestive tract. There is sufficient amount of evidence from carcinogenic substances extracted from the food products that makes it possible for animals to receive experimental tumours.

In the USSR every effort was made to decrease the level of benzpyrene content in food products. It is quite possible to say that today there is practically no threat to the Soviet citizen by any enhanced doses of carcinogenic substances contained in food.

In the Soviet Union it is prohibited to break the rules concerning the prophylaxis of occupational cancer, those that are directed at the elimination of any impact of carcinogenic industrial factors on the organism and those that can result in the development of pretumour illnesses. For instance, protective contrivances for the prevention of various chronic skin diseases are used in those work places where there is a danger of frequent burns and the skin irritation by chemical substances. At the industrial enterprises the carcinogenic oils are replaced by those that are not, particularly where workers' hands come into contact with machines. If the worker deals with preparations of radium, all the manipula-

tions are carried out with the help of special instruments and by using a protective means that hinders the influence of radioactive radiations.

Prophylactic methods are used to prevent pretumoral lung diseases of the miners.

The use of simple protective means at work, e.g. special aprons, gloves, preventive tubes, have proved very helpful in eliminating the danger in the development of pretumour skin diseases in roentgenologists. It is necessary to mention once more that inconsiderable doses of rays which the patients receive during the X-ray examination, even when such tests are repeated, are absolutely not hazardous.

These are only some of the examples illustrating labour protection for purposes of the prophylaxis of cancer.

### **Detecting the Sick**

The next component of anti-cancerous struggle is the active detection of people with malignant tumours. The very idea of early active detection is extremely simple, and it can be easily substantiated by data of elementary statistics. The fact is that, as is the case with all the diseases, cancer passes through certain stages, the time at first measuring many years, then diminishing at a progressive rate. The period from the emergence of the first clone of the malignant cells to the easily distinguished tu-

mour covers 7-8 years. From the first stage, when in the case of appropriate treatment more than 90 per cent of the patients are cured, to the second stage, when the number of cured patients is 20 per cent lower, it takes several months. Then in a relatively short period of time comes the third stage, when the chances of recovery are twice lower. There follows a very simple conclusion—it is essential to detect cancer in the patients when the hope for recovery is still great.

The public health administration is confronted with an exceptionally difficult task: How to find amidst the enormous mass of people of different ages those who are victims of the disease and are totally unaware of it? Isn't it like looking for a needle in a haystack? The cancer rate in the USSR comprises approximately 180 cases per 100,000 people. Hence to find one sick person, it is required that 550 healthy ones should be examined. Moreover, the examinations should be conducted without any interruption in professional labour and without the use of any special methods requiring time loss or demanding particular conditions.

In a large number of cities in the Soviet Union the questionnaire method is being approved. Its sum and substance consists in taking into consideration a number of given features and objectively detecting groups of people with a greater degree of risk

to contract cancer of a certain localization. These features are introduced into the questionnaire, which is then multiplied and processed by means of a computer. This is the way people with a sufficient number of 'suspicious' features are singled out. In addition to age, sex, harmful habits and initial symptoms of the disease which people usually pay no attention to are taken into account. Those selected according to the data of the questionnaire are required further to undergo a complex examination.

Among the methods of the active and opportune detection of cancer a major role is played by the routine medical examination that is conducted according to a particular procedure. Suffice it to say that nearly half of all the tumours refer to the "visual" category, and can be detected by palpation and other commonly employed means of examining the patient. These tumours include those of the skin, mammary glands, oral cavity, the lower lip, external genitalia, neck of the uterus, rectum, superficially situated lymph nodes, and the thyroid gland.

Special examination rooms have been organized in polyclinics for the examination of women and, more recently, of men too. The examinations are provided by trained doctors' assistants and midwives.

It may seem strange that such a responsible function rests with medical personnel of no higher professional qualification. How-

ever, time has made it clear that the detection of cancer and precancerous conditions in those examination rooms is considerably greater than in some other sections of the treatment and prophylactic network. To some extent this is due to the comprehensive use of the cytologic method of investigation employed in the examination rooms, and which has proved to be both simple and reliable in diagnosing the developing cervical carcinoma when the tumour is so small that it is inaccessible to the eye.

The scientists associate the use of the cytologic method in practice with the hope to totally overcome the cervical carcinoma since, detected in its very initial stage, it lends itself to a complete cure by means of only a minor surgical intervention. The fact that it is possible is evidenced by the example of a number of countries where the cytologic method had been widely employed before it began to be used in the USSR. According to the data provided by the American Cancer Society the death rate resulting from carcinoma of the uterus in the USA in 1945 (before the method was introduced) comprised 23.5 cases per 100,000 people, but had gone down to 11.9 cases by 1955. Similar results have been received in Japan, Canada, Norway and the Soviet Union.

For prophylactic purposes considerably more than 100 million people are examined annually in the USSR. The number of pa-

tients that has been actively detected is on the increase. Over the past 10-12 years it has gone up three times in some regions, but on the whole it does not yet exceed 10-11 per cent of all those in the country who have gotten sick. Thus, efficiency seems to be no higher than that of an old steam engine. But that 10 per cent means tens of thousands of lives who have been saved. Nearly 500,000 people who have first contracted malignant tumours are registered in the country every year; 10 per cent means 50,000 lives, or the population of a whole city! These people were saved owing to properly organized and adequately conducted prophylactic examinations. And yet why is it that this kind of painstaking work has such a low efficiency?

Partly it is because of inappropriate organization. For instance, from year to year the very same workers are examined at industrial enterprises. Moreover, they are all young, meaning cancer is less probable. What takes place is a phenomenon that is contrary to what occurred at one of the provincial theatres in old Russia.

The director, who decided to stage a play with several crowd scenes, requested the local military commander to let him have a unit of soldiers for the performance. Well, the colonel agreed, but each time sent a different unit to the rehearsals... In our case, one and the same contingent is sent to the prophylactic examinations,

whereas others remain outside medical control.

However, the main reason which accounts for the low efficiency is the lack of a particular set of objective methods of examination. In spite of the fact that cytologic analysis and fluorography have actually received wide propagation, their possibilities are limited, which is a problem that scientists are most assiduously trying to tackle. This can be illustrated with the help of an example from the fluorography of the chest organs.

The method has been consolidated in the struggle against the latest forms of tuberculosis, but as this mass disease is being liquidated its use for the diagnosis of lung cancer in the initial stage has been on the increase.

The comprehensive and appropriate use of fluorography helps to detect up to 30 per cent of all those who are ill. And what about the other 70 per cent? Why is that a person who was X-rayed, for example, in January and found to be healthy is discovered to have lung cancer as early as May, when there could be no doubt that the disease itself had existed before and could have been detected on the fluorogram? Moreover, looking through the old fluorograms of the patients, we very often become consolidated in our opinion that though the changes had already existed a year and sometimes two years before, they had not been

identified. The question is: Why?

To answer this question the following experiment was carried out. Several experienced roentgenologists, including a well-known professor, were asked to examine a series of fluorograms (the diagnoses had previously been known, although the ones participating in the experiment were certainly unaware of them). Within the first hour only the correct answers were given. As the "examinees" got tired, the percentage of errors began to progressively increase from hour to hour. By the end of the day even half of the professor's conclusions were found to be wrong.

But one can hardly attribute all the mistakes to fatigue alone. There also exist objective difficulties of diagnosis—the quality of fluorograms, the proficiency of the roentgenologist, to say nothing, of the "ultimate" possibilities of the method itself. However, with all the other conditions being equal, during the first hours of their work the roentgenologists made only a few mistakes, and if they did not give a correct diagnosis they could at least distinguish the pathological fluorograms from the ones that were normal. On the whole this was quite sufficient, since any changes allowed the doctors to call the person in for a most thorough examination.

Statements of this kind led to the idea of "teaching" the computer to read fluorograms. The task that is set before the

machine is to distinguish the norm from pathology, with the doctors doing everything else later.

The annual figure of fluorograms in the USSR is 100 million. Imagine how many fluorograms doctors would have to examine to detect those who have contracted this disease. It is indeed the quest for a needle in the haystack! And how the efficiency of the work would be enhanced, if the roentgenologists studied the films after a preliminary selection.

This was found to be an excessively complicated task. Its solution called for the participation of mathematicians of the highest rank headed by Academician I.M. Gelfand. The ingenuity of these scientists is absolutely remarkable. As is known, the lung, and consequently the diseased foci in it, can be hidden behind the ribs. The mathematicians taught the computer "to extract the ribs" from the fluorogram, and thus exposing the lung for observation. Hence, the pathological foci came into view. This is just a small part of what has been actually done. By 1986 the problem was solved in principle, and now it has become necessary to create and use machines for reading the fluorograms. This is only one example of the research and organization activity connected with the improvement of methods for the opportune detection of people with malignant tumours.

## A Difficult Diagnosis

If prophylactic examinations according to various methods are conducted by physicians in all specialities, diagnostics and treatment remain the task of oncologists. To give a subtle oncological diagnosis is no less complicated than to solve a crime mystery. The analogy is not without reason. A large number of case histories, if we look at them through the eyes of Georges Simenon, represent detective novels each with a genuine tragedy and where the protagonist is certainly the patient. Not a secondary role is attributed to the relatives, the doctors and the medical personnel. The disease snatches a person from his customary way of life and throws him onto a bed in a hospital ward.

It was the eminent Russian writer Alexander Herzen who in his story *Doctor Krupov* was the first to draw his readers' attention to the fact that a doctor could not speak of a subject by its outer appearance: by its appearance alone the whale had for a long time been considered a fish. First and foremost it is necessary to ascertain that, for instance, the visible hardening or ulcer has a tumoral, rather than any other, nature.

The confirmation of the presence of malignant neoplasm is not the final stage of a diagnosis, but only its inception, since the question pertaining to the possibilities

of treatment, the choice of method, etc. can be solved only after a thorough examination of the patient and the tumour itself with all its peculiarities.

It is very important to specify in what organ and in which of its parts the tumour is situated since, for instance, carcinoma of the cardiac part of the stomach or of the pyloric part requires quite different operations. This regularity can be applied to many localizations of cancer.

Besides, the oncologist is obliged to know the degree to which the process has spread, because with the growth of the tumour and its penetration into neighbouring tissues and organs the task at first is to spend the maximum amount of time on the operation, since surgical intervention later may be either useless or more dangerous than the disease itself. The very same circumstances can call for the such additional means of impact as radiotherapy and chemotherapy.

As far as the structural characteristics of the tumour are concerned, it can be said that the less differentiated it is, i.e. the further it has deviated from the original tissue in structural terms, the less successful the operation will turn out to be. Hence, it is customary to divide tumours into surgical, when it is possible to expect a successful outcome of the operation, and therapeutic, in which case an operation is not likely to help and it becomes impera-

tive to employ conservative methods of treatment.

Today the Soviet specialized institutions have developed scores of methods facilitating the diagnostical mission of the oncologist.

At the Herzen Institute, even in the case of such an "accessible" tumour as breast cancer, detailed questioning of the patient, examination and palpation are supplemented, as a rule, by a multi-lateral complex of control. This includes: roentgenography of the gland, the infusion of a contrast substance into the lactiferous ducts, followed by a roentgenological investigation, the study of the lungs by X-rays, the infusion of contrast substances into the vein of the thoracic wall so as to get its X-ray picture, analysis of how the tumour absorbs radioactive isotopes, puncture of the tumour with a thin needle to extract cells for "testing" and the analysis of the patient's hormones. If, however, these methods have not revealed the essence of the process to the full, a diagnostic operation, removing only a part of the gland, and the speedy histological investigation of the tumour are conducted.

A careful comparison of all the data enables the oncologist, or, as is customary to say in these quarters, a joint consultation of a surgeon, radiotherapist and a specialist in drug therapy, to compile a rational plan in which the surgical operation is usually

the most significant and occasionally the most difficult, although indispensable stage of multi-component treatment.

### **Surgery Lives and Develops**

The everflourishing opinion exists that the surgical method in oncology is becoming "extinct". This myth is by no means new.

A little over half a century ago an article by the Leningrad surgeon Professor A.M.Zabudovsky was published under the following title, which seems rather odd today: "Is it necessary to operate on carcinoma of the stomach? If yes, when exactly?" The title of this paper reflects the pessimistic views of the author on this problem. However, the surgical treatment of carcinoma of the stomach is adamantly efficacious in 40 per cent of all cases, while in the early stages of the disease the results are even better. We have every reason to say that no other method of treating this form of cancer exists.

Even in the case of cancer of the cardia, which does not lend itself so easily to surgical intervention and which has been referred to as absolutely hopeless by quite a few specialists, every third patient subjected to a radical operation has been cured.

We have not made the proviso: "Subjected to radical operation" in vain since, unfortunately, many people are not operated because the disease has been neglected, be-

cause patients refuse or because of general contraindications.

Senescence is often associated with an entire number of serious diseases of the cardiovascular, respiratory and endocrine systems. The age of our patients, as a rule, is quite advanced.

In the last few years surgical treatment has been widely recommended to patients whose health was in an aggravating condition (excluding cases of widespread cancer). The successes of gerontology, therapy and anaesthesiology make it possible to more often operate on old patients with concomitant diseases. Every single oncological surgeon has his own record of patients in their seventies and eighties, and yet have propitiously survived very serious operations connected with cancer.

Nowadays the patient's age as such does not exclude the possibility of surgical treatment.

A consultation of specialists including an oncological surgeon, an anaesthesiologist, and a therapist find it practically their daily duty to discuss all "pros" and "cons" of surgical intervention. But where are the scales on which to weight the risk of an operation with any great degree of accuracy? Unfortunately, scales of this kind do not exist! But what does exist is the experience, intuition, skill and the unbounded desire to help the patient. We, the oncologists, always remember the behest of Peter Her-

zen that we are deprived of the right "to be brave at someone else's expense".

Oncology sprang from the bowels of surgery.

Today, as in the beginning of the century, when oncology was only in its state of inception, operating was and still remains the most important and in many cases the only radical method of treating patients with malignant tumours. In most cases the radiation and medicinal kinds of treatment for tumours are a significant complement to surgery, which remains the essential method. This opinion is also shared by such specialists in chemotherapy as the Soviet Professor A.M. Garin. He writes: "Surgery is successful in the early stages. Surgical methods are inadequate in controlling metastatic spreading. Moreover, one can hardly call the removal of an organ or an operation inflicting injury the optimal solution of the problem. Until now surgery remains the basic method in oncology, although we cannot but notice the trend characterized by a decrease of surgical intervention. This is not a mere retreat from the radical to the less radical operation; it is rather a substitute of the organ-preserving operations for the radically crippling ones in addition to radiation and chemotherapeutic preparations, to maintain the radical character of the treatment." Further he writes: "The future is not with the scalpel."

And indeed, it does sound tempting to

cure cancer by means of several injections, tablets, or radiotherapy. Unfortunately, in the vast majority of cases this is impossible and will be, even in the foreseeable future. Let us turn to the facts. Radiotherapy of tumours has existed for nearly 80 years. Over the past 30 years the departments of radiotherapy have been completely re-equipped. Various sources of high energies with programmed control have begun to be widely used. The number of radioactive isotopes, employed for diagnostic and medicinal purposes has been increasing enormously. The means of enhancing the efficiency of radiation as well as the medicinal and physical therapy are highly varied. The same can be said about the methods of decreasing the danger of irradiation for healthy tissues. And, nevertheless, in spite of all the achievements in this branch of science, radiotherapy as an independent kind of treatment of malignant neoplasms is still used for only some types of tumours. It is basically employed as a complement to surgical intervention or in combination with chemotherapy. What accounts for this state of affairs is that, irrespective of the truly heroic efforts on the part of radiologists and radiobiologists (the scientists studying the influence of radiation on biological objects), the sum and substance of the activity of rays on the tumoral cell is not yet sufficiently clear. As in the questions pertaining to carcinogenesis, no theory has

been created yet in radiobiology that would explain all the aspects and variants of the radiation impact upon the tumour and organism. Until now we have not rid ourselves of the complications of radiotherapy and we cannot always overcome the stability of many, particularly highly differentiated malignant tumours when being treated with radiation.

The situation is even more complicated in the field of chemotherapy. As a scientific trend it has existed for 40 years. The successes of chemotherapy are beyond any doubt, especially in the treatment of systemic malignant diseases. Speaking of carcinoma *in situ*, that originally developed locally from the epithelium, it would be highly relevant to cite Garin: "Slowly, very slowly, chemotherapy superseded the surgical methods of curing tumours in the early stages. The emergence of new antibiotics, such as Adriamycin and bleomycin, was estimated by some chemotherapyists as the death toll for surgery in oncology.

Our experience has proved that this was the toll of the smallest bell. It is only in the case of very small tumours that the medical treatment is most effective."

Hence, it is early to bury oncological surgery. Besides, according to statistical data, the surgical method in oncology is used most often in all countries, and regarded as the most effective, for early forms of tumours, which in a given stage of devel-

opment is predominantly characterized by the local growth. At present the tumours, which do not develop immediately as the type of systemic illness with almost synchronous emergence of a multitude of new foci of the disease (metastases), are surgically cured in up to 90 per cent of all cases. It is mainly because of the improvement in the situation of diagnosing cancer in its initial forms. During the first stage of cancer surgeons can already deviate from the precepts of oncology and perform organ-saving operations, which only recently have been strictly forbidden. For instance, there has been a rise in the number of operations preserving the unaltered part of the injured lung tissue. This tissue right there on the operating table is included in the process of breathing and gas exchange, letting the patient cope with the trauma much more easily. The inculcation of operations of this kind, in practice, has demonstrated the possibilities of surgical treatment of lung cancer primarily for old people and those with heart-and-lung insufficiency.

The development of a functional trend in oncology becomes particularly noticeable if we regard the changes in the character of reports and demonstrations at sessions of the Scientific Oncological Society of Moscow and the Moscow Region. The period when demonstrations included the results of super-extensive large-scale operations has

long passed. What struck the imagination in those days was the skill of the surgeon, and certainly, the endurance of the patient. Today they speak mostly of the importance of organ-preserving operations (without impairing their radical nature).

At the working sessions of the Society we rarely hear any applause now as in the days when certain groups of patients would do various physical exercises in the presence of those who attended the meetings. For instance, a woman who, according to the character of the tumoral process, would have lost her leg at the hip joint used to squat several times in succession, or a young man who would have had his arm amputated together with the shoulder blade used to box around like a professional...

The organ-preserving operations on the rectum, urinary bladder, and larynx, though not so impressive, are nevertheless no less significant for the patients.

And yet let us not delve too deeply into surgery, lest we should find ourselves in the position of Professor Shubin on one particular occasion when a young doctor—a trainee at the refresher courses for physicians—came to see him about an operation connected with the cancer of the head of the pancreas (a characteristic symptom of this disease is mechanical jaundice that colours the skin and sclera or white of the eye). The operation continued for almost four hours, and during the entire time the sur-

geon explained to the young colleague the subtlest aspects of the technology. But when everything came to an end and he asked the young man whether the course of surgical intervention was clear to him, the young man nodded and once again looking at the yellow colour of the patient's skin asked just one question: "Now, tell me why you put iodine all over your patient's body?"

New methods of surgery are acquiring greater significance.

Within the past few years the local freezing of tissues, or cryosurgery, has been appreciated in oncological clinics. The cold destroys the tumour, and it is replaced by the connective tissue. In addition, a very delicate cicatrix on the surface is formed. Cryosurgical operations are especially justified in those cases when the doctors have to deal with the skin tumours of the face, when the use of scalpel can give rise to cosmetic defects, as well as in such inaccessible parts as auditory meatus.

Optical quantum generators (lasers) are also widespread now. Laser is characterized by exerting a short impact on biological objects with its light beam of extreme power, thus causing specific changes, resembling burns in the tissues.

The advantages of using laser in oncology are the instantaneous impulse, a high degree of selection regarding pigment structures, an enhanced sensitivity of tumours

to radiation, the bloodlessness and painlessness of the procedure, minimum side effects upon the neighbouring normal tissues and on the whole organism as such.

The perfection of each surgical method takes years of most strenuous labour, which is no less fascinating than the work connected with elaborating the theoretical foundations of oncology.

The year 1896 was very fortunate for oncological studies. William Stewart Halsted suggested an operation in the case of breast cancer that had become a model for other surgical operations. That same year, not more than several months after Roentgen discovered penetrating rays, an attempt was made to treat cancer by means of roentgenotherapy, which soon became another classic method of curing malignant tumours. In conjunction with this it should be mentioned that in 1896 the Professor of the History Museum in Paris, Henri Becquerel, discovered the phenomenon of radioactivity, and thus "stimulated" Marie and Pierre Curie into the quest of radium.

The beginning of the twentieth century coincided with the new era of combating cancer.

### **Radiation Energy Serves Oncology**

Records of Soviet roentgenology and radiology have been kept since the victory of the Great October Socialist Revolution.

Even in the country's most difficult days—the civil war and ruin—the Soviet government did not spare any money for the development of fundamental research. In 1919, on the initiative of Professor M.I. Nemenov, and with the active participation of A.V. Lunacharsky, the Petrograd Roentgenoradiological Institute was established. It was the first specialized scientific institution of its kind in the world. In its wake similar institutes were organized in Kiev, Kharkov, Moscow and other cities.

There is not a single branch of medicine that would be in such close relationship to the physical and technical aspects of the matter, and so dependent on its methods, as radiotherapy. Nowadays X-rays are used rather seldom for purely medicinal purposes. What is employed in their place is the more powerful sources of radiation of electromagnetic and corpuscular nature.

We would like to remind those readers who left school many years ago and who have now but a smattering of physics that corpuscular radiation is a stream of elementary particles: electrons, positrons, neutrons, deuterons and alpha-particles. The electromagnetic X-ray and gamma-radiation are defined as streams of quanta that do not have any charge and the energy of which is determined by the physical characteristics of the wave (frequency and length). Both types of electromagnetic ra-

diation are propagated in the vacuum with the velocity of light.

There is every reason to believe that the essence of the biological activity of all variants of radiotherapy is the same: the emission of elementary particles from the nucleus of the radioactive isotope and their absorption by the cells and tissues are accompanied by gamma-radiation. However, the diversity of its sources predetermines the truly unfathomable possibilities of varying the doses and means of bringing them in contact with the focus, on condition that there would be minimal radiation damage to the surrounding space. In addition to this the natural radioactive substances (radium and mesothorium) are now rejected and are replaced by the artificial ones that are considerably cheaper and, what is more important, are more selective in treatment. The radioactive alloy of cobalt with nickel produces needles, thread, beads, etc., which are then inserted into the corresponding places for the contact irradiation of tumours. An artificial isotope of gold is in the form of a colloid solution introduced into the abdominal and pleural cavities. A liquid solution of the radioactive isotope of iodine can be introduced intravenously and has the ability "to find" metastases of carcinoma of the thyroid gland and actively attack them. The "old" radioactive guns were replaced by devices in which accurate doses are regulated and irradiation fields are

contoured into any general form. The patients are treated by means of an accelerated flow of electrons, protons, etc.

Though many years have passed since the time when the radiation method came into use, in spite of the fact that its successes have been quite impressive, the biological activity of ionizing radiation has not yet been made clear. And again we are confronted with one more of the paradoxes of modern science. We become convinced that the absence of any clarity cannot hinder the improvement of practical applications.

What nevertheless is clear?

Radiation energy suppresses the ability of tissues to be restored (which in scientific terminology is referred to as regeneration) at the expense of restricting the growth and reproduction of cells. This is certainly true in the case of specific doses, since those that are too large merely destroy the cells, irrespective of whether or not they are needed by or harmful to the organism. If all the cells and tissues reacted to irradiation in the same way, then radiotherapy would be impossible. Fortunately, this is not so. Depending on a number of the biologically characteristic features of the "object", the results of irradiation are highly varied.

It would not be out of place to mention that a tumoral cell is distinguished from the normal one mainly by the rate of division, which is precisely the property on which the reaction to irradiation depends,

i.e. the more expressed the ability of the tissue to reproduce the more rapidly the cells are divided and the more sensitive they are. Alas! The very same tissues are characterized by an enhanced ability to reconstruct themselves. Hence, it is difficult to guess what the effect of a single instance of irradiation will be. It has to be repeated many times.

A well-known trick is when a weak person can make a much stronger person move from a firm standing position, or even lose his balance. The secret lies in the rhythmically rapid, light strokes on the surface of the body. These painless blows are found to be far more effective than a single powerful amount of pressure. Outwardly it has very much in common with radiotherapy.

We are convinced that its salutary effect depends on the skill of a radiologist in the same way that the outcome of an operation has very much to do with the skill of a surgeon. And in the actual case, the radiologist, following the data of the patient's examination and the location and morphological characteristics of the tumour, selects the source of radiation, the optimum dose and means of bringing it into contact with the target, tempo, length of intervals and so on. This kind of multifactor analysis is a typical task for the computer. At present miniature computers render enormous assistance to specialists at a number of leading radiological centres.

Unfortunately, not all types of cancer are sensitive to radiotherapy. Nevertheless we manage to totally "liquidate" a great number of tumours by applying this method, successfully bringing together different variants, including certain stages of cancer of the cervix, cancer of the skin, tongue, lip, etc.

A clear illustration of the not yet fully discovered possibilities of radiotherapy is the evolution in the tactics in the treatment of lymphogranulomatosis. Over the past decades the tendency has been to stick to a so-called radical programme: in addition to the obvious foci of affection, all the lymph collectors above and below the dia-phragm are made to join in the zone of intensive radiation. The positive results are quite evident. Only quite recently the successful treatment of patients of the first and second stages of lymphogranulomatosis who continued to live for five years was not more than 10 per cent. Now the percentage has gone up to 80-85. Those who survive for over ten years number 60-70 per cent. This is a prominent achievement.

In the Soviet Union radiotherapy in its "pure" form as the only radical method is given to every third person with a malignant tumour. Its use has still greater importance in combination with other methods. This kind of treatment was necessary each time a patient came for help later than he or she should have, and the tumour

had spread out of the boundaries of the initial focus and no single operation or an instance of radiotherapy could save his life. A very striking example of this kind of treatment is the fight against carcinoma of the thyroid gland.

Let us imagine that some young man has a rapidly growing part of the thyroid gland and his general state of health is becoming much worse. The examination has revealed cancer with metastases in the lymph nodes of the neck and both lungs. This form is often found in young people. A quarter of a century ago this terrible diagnosis was not much different than a death sentence. Today the patient is at first subjected to radiotherapy with the help of an apparatus that contains a fair amount of radioactive cobalt in its head. An intricate system of devices helps to form the fields and regulate the doses in such a way that almost the whole bundle of rays is concentrated on the tumour, while the healthy tissues of the strong organism remain practically untouched. When the tumour and metastases markedly decrease and their biological activity diminishes, the thyroid gland and the lymph nodes of the neck are removed. As soon as the patient recovers from the operation, he returns to the radiological section, and intravenously receives a dose of radioactive iodine. As has been mentioned, this preparation is selectively accumulated in the lung metastases, which retained the vital

property of the thyroid gland "to draw" iodine to itself. And since the radioactive isotope of iodine is "absorbed" by the metastases, there takes place a concentration of the activity which is found to be sufficient for the liquidation of the remnants of the tumour. When necessary, the procedure is repeated at particular intervals.

Even in the case of such a severe tumoral process the combined treatment, as has been ascertained at the Herzen Institute, makes it possible for two-thirds of the patients to live and work for 5-10 years, sometimes more. There are patients who are observed to be in good health for over twenty years.

Another specific example is the following. At an anti-cancer congress in Argentina, one of the delegates shared his experience of treating a neglected form of lung cancer. The surgeon opens the patient's chest, and if he finds that the tumour does not lend itself to operation, he asks the radiologist to come into the operating room. The latter introduces special small, radioactive wires into the tumour. After a certain period has elapsed the operation is repeated, and there are cases when the tumour markedly decreases in size and becomes technically removable. The speaker went on to say that some patients who have undergone this kind of treatment have already survived for five years.

The question arises: Why aren't patients

with lung cancer and a tumour that cannot be easily removed given this treatment? Because not every kind of tumour lends itself to radiation activity in the same way. The fact is that the general pattern—the dependence of the effect upon the rate at which the cells are divided—is not absolute and there exist a large number of other attendant circumstances which cause serious results. Besides, the threshold of radiosensitivity of the tumour and the healthy tissues is frequently very small and the dose used to liquidate the tumour can harm surrounding organs, including those that are of vital importance. This is where it becomes dangerous, since by killing the tumour we can also kill the patient. This problem has been tackled by many generations of scientists.

In 1909 the German roentgenologist Schwartz noticed that if the skin is squeezed and thus its blood circulation is depressed, the sensitivity to irradiation weakens and it becomes quite safe to increase the doses. It was further established that changes in the saturation of tissues with oxygen, brought about by various means including a reduction in circulation, exert a completely different influence on the radiation sensitivity of tumoral and healthy cells. This opened a new horizon for practical activity. In the Soviet Union, the first to avail themselves of this opportunity were the doctors at the Herzen Institute in Moscow. This

was done on the initiative and under the guidance of Academician A.S. Pavlov.

The radiologists followed two directions: (1) prior to and during irradiation the patient is for a certain period of time placed in a pressure chamber with an increased pressure of oxygen (up to three atmospheres); (2) when there are tumours on the limbs of the patient, a tourniquet is applied for the purpose of hindering blood circulation before initiating the radiation process.

In the first case the oxygen exchange in the tumour noticeably changes, and the tumour becomes more susceptible to ionizing radiation. In the second case the resistance of uninjured tissues grows, which helps to substantially increase the dose. Here and there encouraging results have been received, particularly in some forms of lung cancer and sarcomas of the limbs.

What is most striking is that the experience connected with radiotherapy in a pressure chamber also proved to be useful for the intensification of efficiency and the decrease of toxic properties of a number of medicinal preparations used in oncology.

Moreover, scientists have discovered chemical substances which stimulate the radiosensitivity— radiosensitizers—of tumours. With their help chemoradiotherapy has been organized and is now widely recognized. On the other hand, in experiments on animals chemical substances were found which protect normal tissues from being pe-

netrated by X-rays, they are called radio-protectors. At present major research connected with the introduction of radioprotectors into the clinics is being conducted.

Sometimes it becomes possible to enhance the effect of radiotherapy at the expense of what seems to be simple methods, which provide all the necessary facilities to achieve "delivery" of energy to the target and also decrease the usual hazard to the personnel of the radiological departments. For instance, specially made small hollow tubes are brought into contact with the affected area, where they are secured. X-ray control keeps these devices properly adjusted. Then the patient is placed in a specially protected ward where he is bombarded for 2-3 seconds by active preparations passing through these tubes. It should be mentioned that cures in the clinic (of, say, carcinoma of the cervix) is achieved in 91.4 per cent of all cases, while the number of radiation complications is reduced by three to four times. Owing to the fact that a large number of stages of radioactively hazardous procedures are eliminated, the doses of radiation exposure received by the medical personnel have become five times lower.

Scientists never stop their quests of new sources for radiotherapy. The use of protons and neutrons is on the increase. Much attention is paid to the design of apparatus for remote-control gamma-irradiation, the use

of linear accelerators of electrons and betatrons. Radiobiology is gaining more ground, and sets new tasks for clinical medicine. In particular, the ability of radioactive iodine to selectively accumulate in the metastases of cancer of the thyroid gland has given rise to the idea of discovering other isotopes that would independently direct themselves towards specific organs. They may even help to transport efficacious anti-tumoral agents to areas of affection. Even now diagnostics has availed itself of the properties of radioactive gold to concentrate in the liver and spleen, of radioactive strontium and technetium, in the bones, etc. The goal is absolutely attainable. Radiotherapy was and remains one of the most important means of suppressing malignant neoplasms.

It should be emphasized again that the achievements in surgical and radiation methods would be much greater if those who come for medical help were patients with cancer in its first and second stages. Doctors would then actually be able to treat what would be no more than a localized tumour. Only after radiotherapy at such a stage, the five-year survival rate comprises 95 per cent for carcinoma of the skin; 80-90 per cent for cancer of the cervix; 85 per cent for cancer of the larynx; 55 per cent for cancer of the thyroid gland; 45 per cent for cancer of the tongue, and so on. If, however, the tumour grows into the

surrounding organs, and particularly if it begins to metastasize, neither the surgeon's scalpel, nor the flow of energy, nor a laser beam can keep the spreading complexes of cells in check, which at a fairly high rate become new sources of cancer. At the same time during irradiation even a complete reverse development of the disease does not render any assurance for recovery if the anatomical position of the irradiated place cannot guarantee the required dose of radiation. Besides, the manipulations of the surgeon on the organ affected by the tumour can also be complicated by "the squeezing out" of tumoral cells carried away by the blood flow.

The organic deficiencies of the two basic methods of treatment are overcome at the expense of their combination. Recently, surgery and radiation have been supplemented by medicinal treatment.

### **Magic "Bullets"**

Chemotherapy made itself known 40 years ago, and the first anti-tumoral means was embichin, a derivative of mustard gas (yperite)—a poisoning agent that was used by the Germans in World War I against the British troops near the town of Ypres (Belgium).

...World War II was raging. At any moment the fascists were expected to launch chemical weapons. American researchers Goodman and Gilman, while studying the

biological effect of certain derivatives of yperite, paid special attention to its inhibiting influence over the lymphoid tissue and rapidly dividing cells. An assumption was made that these substances might as well be tested on tumours, as for instance, in dealing with lymphogranulomatosis. The supposition advanced by those scientists proved justified. The Soviet analogue of embichin—novoembichin, obtained at the beginning of the fifties by Academician L.F. Larionov, came to be efficacious in the case of a systemic injury to the lymphatic system.

The first achievements—the curing of a considerable number of patients whose forms of malignant diseases were considered to be fatal prior to their treatment—imbued the oncologists with hope and gave rise to a new trend in experimental and clinical oncology. But already in 1962 the WHO Committee pointed out that chemotherapy was confronted with an incredibly difficult task: it was necessary to learn how to destroy all the cells of a multitude of tumour varieties, without causing irreparable harm to a single healthy tissue, which in the biochemical composition (not taking into account a certain quantitative distinction) does not differ very much from the tumour in principle. It is a task known to us by the radiation method.

Our distant ancestor, in his quest of medicinal herbs, tried everything that he

came across, testing on himself the pharmaceutical properties of nature. The methods were quite primitive, and were made "more perfect" by experimenting on animals. But the tactics of "choosing" the right medicinal preparation had still remained. The German biochemist Paul Ehrlich gave salvarsane—the anti-syphilitic preparation he discovered in 1907—the number 606, thus historically registering his efforts until he managed to attain success. If someone today thought of giving an ordinal number to any of the 50 or 60 existing anti-tumoral chemical agents, the figure would contain quite a few zeroes.

The scale on which the quest is conducted can be expressed with the help of the following figures: over a period of ten years the anti-tumoral activity of 257 thousand various substances have been tested. The expenses for this research exceeded 250 million dollars. And all the achievements claimed by the National Cancer Institute found the following expression: "In the field of chemotherapy of cancer there has been definite progress which allows us to look into the future with some hope... It became possible to attain a particularly prolonged remission in children suffering from an acute form of leucosis (over one hundred children continue to live for five and more years after the treatment)... The same can be said about the women with chorionepithelioma..."

In the Soviet Union, as well as throughout the world, rational ways of discovering anti-tumoral medicines are being sought. In addition to this, however, specialists deal with almost one thousand preparations every year. Thus, on the average, 2200 synthetic compounds, plant-derived preparations, and antibiotics are annually subjected to experimentation. Only two per cent of them reveal the required properties. To say the least, world practice has shown that only an insignificant part of the substances that can suppress the growth of cancerous cells in animals proves to be useful for clinical purposes.

Unfortunately, chemotherapy has not yet brought about the expected revolution in oncology, although with the help of medicines it is already possible, in the case of 5-6 forms of malignant tumours, to cure the majority of patients without any surgical intervention and radiotherapy. As several prime examples—acute lymphoid leucosis in children, Burkitt's lymphoma, and chorionepithelioma of the uterus. With 15-16 other forms of cancer the medicinal preparations help to supplement the non-radical treatment in different ways, or prolong the life and alleviate the suffering of the patients who for one reason or another can't have surgery or radiotherapy. However, with the creation of new conditions of employing the familiar anti-tumoral preparations and their elaboration, the

possibilities of chemotherapy in the case of some diseases are being substantially improved.

As in everything else that concerns oncology, the results of chemotherapy in many respects depend on the competence of the doctor. At present it is very seldom when only one particular medicine is used in the course of treatment. The synchronous use of agents which, in the first place, disturb the metabolism of tumour cells in its different units, and secondly, destroy tumour cells in different phases of division has theoretically been substantiated. Besides, it becomes necessary to avoid an identical side effect lest the toxic activity should be enhanced. The most appropriate combinations of chemical preparations are, as a rule, much more efficacious than each of them taken separately.

The drug therapy of cancer is not confined to any specific limitations; what promotes its activity includes hormones and substances that regulate the organism's own defence forces.

The hormonal treatment of cancer is a complicated field. It is based not only on the concepts of hormonal dependence of some forms of malignant tumours, but also on the significance of hormones in the ageing of the organism and other biological transformations.

The birth of this method is associated with the name of American scientist Charles

Huggins. After laborious and complicated experiments he established the role of the antagonists of the male sex hormone in counteraction to cancer of the prostate. In 1966 he was awarded the Nobel prize because of this outstanding discovery. But the significance of it was much greater since Huggins formulated two new principles of oncology on which hormonotherapy is founded: (1) cancer is not necessarily an autonomous and internally self-sustaining process; (2) hormonal secretion can "not hinder" but even stimulate the development of cancer in ordinary, redundant or lowered level of activity.

A particular effect, as could be expected, is found with the treatment of hormone-dependent tumours, e.g. cancer of the uterus, thyroid, prostate and mammary glands.

It has long been known that the development of breast cancer is influenced by the sex hormones, and in the neglected stages the ovaries are sometimes removed. This measure is not always sufficient; the growth of metastases does not cease presumably because the hormones continue to come from the adrenal glands, which "have brought upon themselves" a part of the lost function of the ovaries. After artificial hormones of adrenal glands essential for life were synthesized in the laboratory in the 1950s, it became possible to do away with this organ. However, the patients come through this kind of operation as through a very

severe trauma and are tied to the drugstore for the rest of their lives.

The late Professor N.N. Alexandrov and his pupils, basing their assumptions on the fact that liver cells could destroy sex hormones, without harming others secreted by the adrenal glands, developed an operation with the aim of maintaining the outflow of blood from one of the adrenal glands only through the liver. The first transplants of the patient's own adrenal gland gave encouraging results: a group of women with neglected breast cancer managed to survive for 37 months on the average, or by more than three years. Several years of "granted" life today hardly call for any special comment. Science has persistently been working out an inventory of ways and means, and one cannot even surmise what it will arm the doctors with in the near future... A case in point is the following example.

A middle-aged woman came to the Herzen Institute for consultation. Extremely busy with interesting work, her duties as mother and wife, she did not pay much attention to her health and "failed to notice" the change that had taken place in her breast—the lymph nodes had increased in size. When examined by the doctors, it turned out that she had breast cancer with numerous metastases in the bones.

On discussing this case the optimum plan of treatment in the given situation was approved.

Irrespective of a marked development of the process, it was decided to begin with an operation in order to, by removing the breast, reduce the volume of tumoral tissue in the organism and to improve conditions for drug therapy. At the same time her ovaries were also resected, which served as a prerequisite for the effective use of hormones. Immediately after the operation chemical and hormonal preparations were introduced.

Meanwhile the grievous and inevitable outcome was being postponed with every month. An excessively active synthetic anti-hormonal preparation was developed, and had the last say.

Without dwelling on medical technicalities, it should be mentioned that many years have passed since. This woman was head of the department at a higher educational institution, went on scientific missions to distant places, and brought up her grandson. There can hardly be any doubt that if she had fallen ill not in 1977, but in 1970, we would have lost her years ago.

What has been said does not in any way mean that we can save every patient suffering from breast cancer irrespective of the stage of the disease. We are frequently confronted with cases which we are unfortunately unable to treat at all.

Charles Huggins's idea that cancer is not necessarily autonomous, in combination with the data obtained by Lev Silber and

his followers, on the presence of immune shifts in the organism determined by laboratory tests stimulated the development of a new science known as clinical immunology. Though the first tests have not yet been very convincing, research is continuing at an accelerated rate.

### **Mobilization of Internal Resources**

There is a particularly intense quest for methods of treating cancer in the field of immunology. One after another, international conferences are held, and monographs and collections of papers are published. I am quite sure that the number of articles, reports, summaries and other published materials has considerably exceeded the number of patients cured with the help of immunostimulation, immunocorrection and other means of immunotherapy.

The founder of modern immunotherapy of cancer, Georges Mathé, who wrote excessively on this subject, some fifteen years ago warned that even if immunotherapy does flourish into an efficacious method of treatment, it would not be so easy to use it... Particular difficulties emerge when the press starts to interfere. On December 16, 1985, a very popular American magazine *Newsweek* had the picture of Steve Rosenberg of National Cancer Institute on its cover with the caption about the quest of cure. This scientist is well-known as a prominent spe-

cialist in the field of oncology. He belongs to the team of doctors that treated United States President Ronald Reagan of cancer of the colon. It was precisely this scientist who declared at a television press conference that the President **had** cancer. This assuredness is brought about by a profound knowledge of the subject and the understanding that an opportune and successful operation can save the patient's life. It should be mentioned that this is one of the most serious arguments against the immunological concept in oncology. And as is actually the case, if cancer is the result of **general** disruptions in the organism, for instance the consequence of a "burst" in the immunological barrier, then the **local** effect of surgical intervention cannot possibly cure a patient with a malignant tumour. In spite of all this, Steve Rosenberg, a talented surgeon, carries out his scientific investigations in the field of tumour immunology.

The first publications of Rosenberg and W. Terry refer to a period as early as 1977. By means of stimulating the immune cells they managed to achieve the rejection of tumours that were transplanted to experimental animals. These tests were complicated and called for highly proficient researchers and a very good equipment. What was worked out in principle was a new variant of an old idea: to turn the natural immune systems of the organism against

the cells of a malignant tumour. The white blood cells called lymphocytes, which, as has been mentioned previously, are responsible for the immune protection of the organism, were taken from the patient and preserved, as it were, in an incubator with interleukin-2. This preparation enhances the lymphocytes immune function. Interleukin is received from specially stimulated blood cells, the tonsils and spleen. The biological essence and technology to obtain interleukin-2 are fairly complicated, and this is not the time or place to discuss it in any great detail or length. The sum and substance, which is clear to everyone, boils down to the fact that killer lymphocytes begin to act only when they receive the "order" from the other lymphocytes, or T-helpers. The command is transmitted with the help of the glycoprotein of a complex structure known as "interleukin-2". Rosenberg and others assumed that as a result of certain irregularities the T-killers do not attack the tumoral cells and do not destroy them for the reason that either they do not receive any order at all (the interleukin is not there), or it is very weak.

The scientists considered further that if killer lymphocytes were kept in certain conditions together with the healthy cells—helpers or purified interleukin-2, then the killers would be stimulated and, upon their return to the organism of the patient, would start performing their function and

relieve the organism of malignant tumour cells. In experiments on animals, which continued for nearly ten years due to the complexity of methods, it occurred that ten types of malignant diseases could be cured with mice, three types with rats, and with guinea pigs—two. It is interesting to note that among the list of malignant diseases of animals there is not a single case of carcinoma *in situ* which could develop independently without the influence of particular conditions of the experiment. This fact once again consolidated the opinion I expressed a long time ago that the immunological mechanism is associated with malignant tumours of a viral origin rather than with cancer.

One way or another in the end of 1985 three radio and television networks in the USA informed their listeners and television viewers that at the National Cancer Institute at Bethesda (near Washington) they discovered an absolutely new method for treating cancer. The special telephone information channel at the Institute was bombarded with about one thousand calls the first day people heard this news. The typical question was: "My mother has less than a year to live. What should we do?" The same answer was repeatedly heard: "I find it difficult to refuse, but we cannot receive new patients now. Let us hope that something could be done in the future." It should be mentioned that Dr. Rosenberg is

a physician and scientist of a very high class who did not waste a single minute to reject the publicity stunt and declared: "This method is not cancer treatment 1985."

What had actually happened was that most of the previous attempts to find the treatment were unsuccessful because at first only interleukin-2 was introduced in the hope of stimulating the lymphocytes "in place", then they were incubated (lymphocytes with interleukin) and introduced together. This aggravated the patients' general state of health and registered as rarely efficient. The use of this method after the tests did not bring the desired results with the first 66 patients, hard times for the doctors dealing with the given problem. At long last an excessively complicated procedure was developed at the cost of 30,000 dollars. With the help of a special separator, all the white blood cells are extracted from the patient's blood. Then for three or four days they are incubated with interleukin-2. What takes place is an activation of T-killers. They are thoroughly washed and returned to the patient's blood circulation system together with the required dose of purified interleukin-2.

A single course of such treatment takes one month. Such a huge establishment as the National Cancer Institute at Bethesda can provide treatment for no more than 8 patients at a time, or 96 patients a year,

while in the USA half a million people become sick every year. The treatment is accompanied by a general depression of the patient's state of health. Sixteen of the patients lost more than 10 per cent of their body weight, and two out of 25 experienced serious life-threatening disturbances in breathing. The method still requires much work. It is so far early to assess its effectiveness, since only a few patients have directly profited from it, and the period of observation has not exceeded one year.

The quest in the field of immunotherapy covers a wide scope of activities. It is only in the past ten years that besides interleukin, special factors for stimulating macrophages—"scavenger-cells" which relieve the organism of any foreign substance—have been tested. The tests involved cytolysin and leucoregulin—recently discovered factors supposedly able to block reproduction of tumoral cells and possibly, dissolve them. Within the leucocytes a factor was discovered which is connected with genetic mechanisms and which produces the protein that can destroy tumoral cells. Much attention is paid to interferon—the protein that is derivative of T-cells, and undoubtedly, counteracts the development of viral diseases. It is possible to obtain it in the pure form in laboratories. Unfortunately, most of the tumours are of the non-viral origin.

Monoclonal antigens present the great-

est interest. They are the antibodies connected with tissues that grow from a single cell, one clone. Over 200 of them have already been artificially produced in laboratories. A characteristic feature of these antibodies consists in a high degree of selectivity. The idea is that they are supposed to find even a single tumoral cell in the organism. It is also assumed that monoclonal antibodies can go together with anti-tumoral medicines and carry the latter directly to the tumoral cell.

Until now information in scientific articles and reviews has come to the single conclusion that this is only in the early stages of experimentation in the clinic. If we take into account the fact that the concept of the role of immune mechanisms in the development of malignant tumours was put forward in 1909 by the German scientist Paul Ehrlich and regenerated, as it were, in 1929 by the prominent Soviet physiologist A.A. Bogomolets, and that the first serious attempts of immunotherapy have a history that covers as much as twenty years, then there is every reason to say that the quest has been somewhat retarded. Work proved to be considerably more complicated than what it seemed to be at first, since cases like these are quite frequent. And immunological mechanisms are by no means the only and the most important ones in carcinogenesis. We should clearly imagine that, according to the estimate

of outstanding French oncologist Georges Mathé, appropriately conducted treatment with the use of scientifically approved methods (surgery, radiotherapy, chemotherapy), and a combination thereof, helps to cure 75 per cent of the oncological patients. The rest turn for help too late and we cannot save them.

Hence, the present task consists in the necessity of organizing oncological service in such a way that each patient with a malignant tumour was opportunely diagnosed and given the required treatment under the guidance of highly proficient specialists.

This is very much hindered by non-professional opinions, the manipulations of those engaged in quackery, and the myths about cancer.

## Chapter Three

# Fallacies in Science or Scientific Delusions

By no means should every person who suggests a new method of treating cancer, irrespective of his profession, necessarily be labelled as a charlatan, quack and someone who is dangerous to society. Moreover, he does not necessarily have to be an ignoramus.

The hullabaloo and unrealized hopes in combination with what may really be called religious conviction most often spring up not around genuine scientific discoveries, but in close association with para-medical myths.

The myths are particularly strong and viable where science comes in direct continuity with the everyday life and experiences of people. In addition, references are continuously made to the generally known historical parallel that remarkable successes have been achieved by people with no special professional training.

It must be noted that not a single "expert" has ever purported to make a great discovery in the field of astronomy, physics, and other natural sciences. On the other hand, there are quite a few who think that they know much more about the treatment of cancer than professional doctors.

The history of medicine knows a plethora of examples when the most prominent discoveries were made not by physicians.

The monk Gregor Mendel in his experiment with peas, based on precise experiments and calculation, made the first contribution to the foundation of genetics, the science that has exerted an enormous impact on present day biology and medicine. The chemist Louis Pasteur, in studying the fermentation of grape juice, discovered microbes and hence the new and comprehensive science of microbiology. At the end of the nineteenth century the physicist Wilhelm Röntgen discovered specifically penetrating rays capable of producing shadow pictures of objects placed between an emitting tube and a photoplate. Among the first X-rays was that of a human hand. It became possible to see the organism "from the inside" and a new science called roentgenology came into existence. Its significance hardly calls for any special comment. The Curies discovered the emission of radium and instructed the physicians how to use it.

But in all these and a number of other cases medicine has borrowed, as it were, the by-products of great discoveries in natural science. Neither Röntgen, nor the Curies took it upon themselves to diagnose and treat patients, but the results of the further development of their ideas in medicine became the sole domain of physicians.

As for Pasteur, this man of genius availed himself upon helping such minds as Mechnikov, Koch, Havkin, and Bezredka, who were attracted by his ideas and each of whom became a founder of a new and comprehensive trend in medical science.

During Pasteur's scientific study of preventive vaccinations no minor role was played by the British doctor Edward Jenner, who prevented the emergence of smallpox by introducing a vaccine that was an extract from cowpox papules. As was suggested by Pasteur, the term vaccination acquired a much broader meaning and became a synonym for any prophylactic inoculation in honour of the contribution made by Jenner—the benefactor of humankind.

Great discoveries are made very seldom and only then when there occur objective conditions; when the required number of facts necessary for a generalization is accumulated; and when there happens to be a scientist capable of synthesizing them and give a new qualitative impulse to the development of science.

As is known, quite a few microbiologists saw the inhibition of the growth of cultures of microorganisms when fungi came in contact with these cultures, but evaluated this fact only in terms of traditional reasoning and rejected these cultures as "not pure". A. Fleming managed to see the possibility of a new phenomenon in principle—the suppression of one kind of microorganism by

the products of the vital activity of others. Together with H.W. Florey and E.B. Chain he carried out experiments which helped to single out the pure and active substance, penicillin, and lay the foundation of an entirely new era in medical studies known as the era of antibiotics.

Scientific discoveries occur rarely. In a considerably great number of cases even the very conscientious researchers mistake the wish for the reality and consecrate their own error. What greatly aggravates mistakes of this kind is the premature publication in scientific, and later in the press, of various superficial assumptions concerning the origin of diseases and mainly of malignant tumours. With many people these publications give rise to unreliable hopes that the diseases could be liquidated with the help of one simple method or the discovery of a panacea. In addition to this the simplicity of the theory generates its comprehensibility, which in the case of an unsophisticated layman promotes the emergence of a certain conviction in its infallibility.

Below are several examples of such mistakes, made without any evil intention, but merely because of an incorrect theoretical premise, or the limitedness of scientific thinking. The biochemist A.F. Lazarev established that in the development of experimental tumours in the blood of animals there is an increase in the concen-

tration of one of the hormones of the pituitary body—the somatotropic (hormone of growth). Sometime earlier B.M. Gazetov had registered a similar phenomenon with cancer patients. Lazarev imagined everything in the simplest possible light: to retard the tumour, or even cause its regression, it is necessary to produce a preparation which would suppress the hormone of growth generated by the pituitary body.

The manufacturing of anti-somatotropic serum had taken considerable efforts. Unfortunately, this serum did not change anything in the fate of oncological patients. Moreover, it was later ascertained that the tumours themselves are capable of producing the hormone of growth. And it is quite probable that its redundancy in the blood is not the cause but a consequence of the development of malignant process.

This serious scientific research found an unqualified reflection in the press—magazines and newspapers. The result—people were led astray and started to “get” the anti-somatotropic serum, thus losing time for the appropriate treatment.

The prominent Soviet oncologists A.I. Se-rebrov and N.N. Blokhin, who devoted much time and enormous effort to the struggle against pseudoscientific methods of treating cancer, wrote in one of their articles how a certain A. Guman, a mathematician in Leningrad, adhering to some quasi-

scientific assumptions had stated that by causing acid-base equilibrium change in the organism of a tumour patient, it becomes possible to "dissolve" it. In exactly the same way M. Zdrenko in Rostov-on-Don treated her cancer patients by giving them extracts of different herbs. The verification of this method showed that the preparation did not possess any specific anti-tumoral effect.

**Why do people make every possible effort to find some "special" methods for treating cancer?**

There are numerous attempts to solve the problem of cancer, which is thought to be of fundamental significance in contemporary medical studies. This can hardly be justified. Cancer is by no means the most frequent illness. However, there are a number of factors in this particular disease that causes the most fear in people. In the following we shall analyze some of them.

### **The Growth of Disease**

Owing to the successes in medical sciences and social progress the length of human life is becoming greater, which means that the danger of "reaching" the malignant tumour age is growing too. It is common knowledge that cancer is a disease which is preponderantly associated with old age. The number of cancer cases over the past century has become noticeably greater, although we should admit that we are totally unaware of the state of affairs in the past. There was

no proper record in this country until the 1940s, and in many countries the situation in this respect remains unsatisfactory even now. In those parts of the world where statistics can be considered authentic, such as in the USSR, it is obvious that growth of this illness within the last 20 years has not been so great, and will certainly not reach that intimidating scale of which the laymen like to talk so much. The same statistics indubitably show a marked discrepancy between the number of cases that have been registered and the death rate. This means that we cannot disregard the increased skill of doctors who detect and cure oncological patients and constantly perfect forms and methods of the anti-cancerous struggle.

Now let us return to the subject under discussion. There remains one question still unclear. At the end of the 1960s, the Terry report was published in the USA. In it mortality due to cancer between 1900 and 1960 was discussed. During this period the country's population more than doubled. It would seem quite natural to expect the death rate to be twice as great too. However, it increased eight times (from 3.3 to 20.9 per cent). Could this be due to the "ageing" of the population? Let us turn to figures. In 1900, 7 per cent of people were older than 60 in the USA; in 1960, the figure rose to 14 per cent. The figure is doubled once again. Such a cause as the in-

crease of the length of life does not cover the redundancy of oncological cases by a third. The presence of this substantial excess allows one to assume that some other motivating factors had also accumulated in the USA. A situation very much like this one can be found in all industrially developed countries.

It should be mentioned that the formal level of disease is greatly influenced by the state of statistics. In 1900, the evaluation was at incomparably lower level than in 1960. Hasn't there occurred a statistical growth of the disease instead of its actual development? And indeed, what can be relied upon implicitly is only the diagnosis confirmed by laboratory tests. The oncologists prescribe radiation and medicinal therapy only when they have the data of histological analysis at their disposal. At the same time statisticians still take into account the conclusions made by the physicians concerning the death rate of patients, without delving into other documents including autopsy reports. Their generalizations are not always exact. And yet, if we take the periods of time that are closer to today when the sources of information were monotypical and the errors were presumably of equal value, it is not difficult to ascertain the true growth of the number of people who had become victims to malignant tumours. However, cancer does remain a rare disease. Every year the lives

of 30 million children are lost to malnutrition and infections, the death rate among the adults over the same period of time is 10 million (tuberculosis and malaria). Ten million people die of other causes, including trauma and 5 million people die from both cancer and cardiovascular diseases. For an English physician who treated 2500 patients (Dr. J. Fry's data), the annual figure for cancer was 100 times lower than for pneumonia. The same number of people suffered from myocardial infarction (heart attack), cerebral haemorrhages and tumours. Moreover, myocardial infarction and stroke are no less dangerous than cancer. What then is the matter? Why does cancer cause so much alarm?

Presumably it is primarily because we are actually far from helping everyone. We make no secret of the fact that a certain number of patients also die after they had undergone the radical treatment as well as in the earlier stages, resulting from complications and later, due to relapses and metastases.

The earlier the tumour is diagnosed, the more chance there is of recovery. This kind of regularity is important not only for oncology. Is there, in fact, anyone who takes appendicitis seriously? If it is not detected in time, the purulent process is bound to develop. Up until this day thousands of people in the world die of peritonitis. But for some reason or other, neither

peritonitis, tuberculosis, dysentery, nor even infarction causes so great a panic as cancer. It raises such fear in people that is referred to as the disease of the twentieth century.

### A Deficit of Information

No minor role can be attributed to the fact that we keep it a secret from the patient who has cancer, and sometimes even from his relatives. On the other hand, people are only too willing to hide from the truth if it actually frightens them. I remember when I was a beginner in my profession a woman came for treatment at our clinic. She was a highly experienced surgeon who had one of her eyes removed (melanoma of the retina) a year before. She was hospitalized in connection with very acute pains in the vertebra caused by the metastases, although the diagnosis which they gave her was radiculitis.

In the same ward with her there was a woman who had breast cancer. "Now, how credulous people are," said our patient when she and the young doctor who treated her had a talk customary among the colleagues. "You told my neighbour that she had an inflammatory process in her chest, and she believed it, although she had her breasts removed. Nobody can cheat me like that. I will recover from my radiculitis and everything will be all right!"

It is only the subconscious wish to get away from the truth that can explain the

blindness of an experienced specialist regarding her own state of health. As it is often the case, if the patient has been cured of cancer, neither he nor the people around him know what he was sick with. If, however, the patient died of cancer, then his relatives, friends and neighbours know about it. Why the person died is less important than from what. Nobody is interested in details. The word "cancer" speaks eloquently enough! Therefore, the fallacy of one person or one family leads to the misconception of many others, and to the distortion of public opinion concerning the danger of malignant tumours, thus giving rise to doubts about the efficacy of modern treatment.

This is an important reason that underlies the idea that people have of cancer. But, in my own opinion it is not only that, but also that the last and most tragic period in the life of the oncological patient takes place before the eyes of the relatives if the patient is at home, or in the presence of other patients if he is in a hospital.

It goes without saying that in the complex of the above causes, the last one is the most obvious. How do those who have consumption part with their lives? From the novels of Konstantin Fedin and Erich Maria Remarque we know that they come out to the balcony, talk with other people, and don't suffer very much from pain. They are quite used to fatigue and a fever. But

the oncological patient suffers from severe and at times humiliating pain. Today much is being done for this category of patients (analgesics, psychotherapy, nursing and others). However, the most important of these is an enormous amount of work being done for the early detection of cancer, which effectively "redistributes" the patients according to various stages of cancer and markedly reduces those that do not lend themselves to treatment. In spite of all the achievements in present-day oncological studies, which we have mentioned before, there is still a mistrust towards our particular field of activity which gives rise to the quest of "special" methods. Very often all this acquires hideous forms.

### **Not Everything Can Be Cured**

The next significant reason why people not even remotely connected with medicine continue to look for new and especially efficacious agents, besides those that the oncologists can offer them, is because of the impotence of medical science in respect to some forms of diseases.

Academician V.M. Zhdanov expressed this idea in a very figurative way: "So far in a large number of cases medical science has been, if not altogether powerless, then not as adequate as required. Without help from medicine, the patient has no other choice but to seek the advice of physicians of different kind. I remember one of my

female acquaintances, who had the cancer of the ovaries. The case was neglected, and medical science had done everything that was possible to prolong her life for at least three or four years (the patient received her treatment at the oncological scientific centre). But when the doctors and the patient herself saw very clearly that the fatal end was near, my acquaintance turned to homeopaths and, though a doctor by profession, even tried to meet the woman from the town of Kaluga who was said to have invented the anti-cancerous vaccine." In this story there is one flaw. It is that although no one could help this particular patient, there was not a single person who could have taken upon himself the arduous task of telling her and her relatives the truth without any reservations.

This is where we very closely approach the fascinating and inadequately explored field of medicine called deontology—the science which deals with the required conduct of medical personnel.

The danger of those "conscientious fallacies" in medical science as well as in quackery lies in that precise knowledge is replaced by surmise, which is presented as absolute truth. It becomes the object of implicit credibility on the part of not only the patients and their relatives, particularly when the disease is one of those that does not yet lend itself easily to treatment, but also the less proficient doctors.

## The Doctor's Behaviour or Deontology

The most difficult aspect in the education of any doctor is learning correct behaviour. It is not so much the question of constantly improving professional skill alone. In the work of a doctor and in the activity of anybody connected with medicine no minor importance should be attributed to the peculiarities of his character, conduct, the ability to come into contact with other people, and the whole moral and ethic personality of someone who has devoted his life to this extremely difficult occupation. Since the days of Hippocrates it has been known that a physician should do his duty, heedless of everything personal, with disregard for his own disposition, feelings, likes and dislikes.

Hippocrates wrote: "A physician should have a good appearance, and be physically fit. Suffice it to say that if he cannot take good care of himself, what good can he do then to others? A physician must be clean, properly dressed and lead a moral way of life."

The correct conduct of a doctor is determined by several important factors which should be taken into consideration.

The qualification of a doctor is not merely knowledge and professional experience, but also special qualities of his heart and soul.

The significance that the patients attach to the general humane qualities of their

doctor are evident from the results of a questionnaire that was distributed by Polish sociologists several years ago. Out of 3200 people who answered, only 39.5 per cent wanted to be treated by an eminent specialist, while 60.3 per cent expressed their wish to have a doctor who was not merited at all, but was known for his sincerity and concern for the patient.

These dry figures received warm and ironic commentary, as it were, by Antoine de Saint-Exupéry at a different time and on a different occasion. He remarked that he believed the day will come when the patient suffering from some unknown disease will rely entirely on the physicists, who, without asking any questions, will take a blood test, derive certain constants, multiply them and then, checking them against the table of logarithms, they will cure the patient with a single pill.

Nevertheless, he continued, he himself preferred going to some old country doctor who would look at him from the corner of his eye, feel his pulse and palpate his stomach, and apply his stethoscope. Then this doctor would clear his throat, light his pipe, rub his chin and give that encouragingly soothing smile. "I certainly do take my hat off before science," concluded Saint-Exupéry, "but I cannot stop taking delight in wisdom."

The representative of any profession connected with service to people must adhere to

particular rules of behaviour. In medicine the correct behaviour is determined not by any rational reasoning, but by the humanitarian principles of the medical profession itself, since the sole aim of the graduate of medical school is to devote himself to helping people, whether he is concerned with the research of the causes of the diseases, prophylactic activity, surgery or the organization of public health. The fact that the training of the medical personnel has acquired a mass character can be regarded from two angles.

Without a large army of doctors it is hardly feasible to actually render any kind of help to the population of a vast country and, therefore, a mass training of doctors is a necessary objective. On the other hand, the requirement of a maximum number of medical personnel leads to almost complete neglect of professional selection and a considerable degree of chance when young people embark on a medical career. It is precisely for this reason that the teaching of deontology to young people—the scientific study dealing with the right kind of behaviour, the art of talking to people, work in a collective—is an extremely difficult task.

It was no mere chance that such eminent surgeons and oncologists as N.I. Pirogov, N.N. Petrov, N.N. Blokhin, N.I. Krakovsky, and S.B. Korzh in their works on medical deontology have adduced the humanitarian nature of medical profession as

the first rule governing the deontological principles.

This, however, does not restrict the objective significance of the doctor's correct behaviour. It is also his professional duty. Petrov wrote: "Surgery attains the height of its possibilities only in the case when it is adorned with the loftiest manifestations of the disinterested case of the patient, and not only of his body, but also of his psyche." Behaviour is the professional duty of every single oncologist primarily because psychotherapy enters into the mandatory complex of measures connected with the treatment of patients and is brought about by medical requirements.

However, very often doctors remain heedless of the demands of deontology and thus make way for various paramedical assertions and hopes. The rules governing the conduct of doctors, the way talks should be conducted with the patients and their relatives, are not regulated by any official documents and therefore the incorrect behaviour of the medical personnel, which gives rise to many complaints and which is responsible for the gravest psychic trauma, cannot practically be penalized.

The doctor's conduct in treating a seriously ill oncological patient whose future is dubious, in talks with the patient and relatives, is fraught with two contrary types of errors which occur at the same frequency and to some extent depend on the

characteristic peculiarities of the doctor. In some cases there takes place an unjustified optimism, in others it is intimidation, or the markedly pessimistic attitude of the doctor to the possible outcome of the disease. Neither this nor that approach should be taken, particularly in the talks with the patients. Any reasoning on the part of the doctor should come only after a thorough check-up and examination and an equally serious talk. A doctor's instantaneous conclusion usually raises certain mistrust in his judgement and leads to searches for another specialist, even a quack.

Unfortunately, we often witness cases now when a superficial and hasty statement made by the doctor inflicts a serious psychic trauma upon the patient.

Several years ago a 43-year-old professor of mathematics came to me for advice. Some months before she felt a slight pain in the mammary glands and they seemed to her to have become more compact when she touched them. Without going through the usual stages of examination, she immediately went to a well-known surgeon, who was not professionally concerned with the pathology of the mammary gland. It took the professor no more than three minutes to recommend the patient for an operation since he thought she had the advanced breast cancer. The patient and her husband were informed of what the professor suspected and a clear-cut plan of her treat-

ment was given: removal of the two mammary glands, ovaries, and possibly chemotherapy. It is not difficult to imagine how frightened this active woman was. She came to us for advice in a state of utter depression, and gave the impression of someone condemned to death. In the course of a thorough clinical examination, which included special methods of analysis, it was discovered that our patient had an absolutely benign disease of the mammary glands which demanded no more than prolonged treatment with the help of medicine and regularly controlled examinations. Many years have passed. This woman feels fine and has been able to work very successfully. We observe her regularly. And what is of great interest is that this highly cultured and educated person told us of the grief she experienced upon being so intimidated, and at that time refused the treatment to look for another doctor precisely because of that hasty examination and frightening conclusion made. How many patients like this woman turn to quack doctors and live many years with the conviction that they have been cured of cancer! Even a greater number of oncological patients die because their first medical adviser did not prove to be sufficiently credible, while the quack doctor neglected the illness further.

If we return to the typical deontological errors: intimidation and unjustified opti-

mism, it is necessary that we should make a special note of the fact that the latter type of mistake is no less dangerous than intimidation itself. It is most often made by general surgeons when they treat oncological patients. They often think that they can treat oncological patients, although they are skilled only in operational methods, and are unaware of the whole inventory of present day oncology. This takes place frequently in the treatment of skin tumours, as well as in the case of melanoma—one of the most dangerous and insidious of tumours.

At a certain regional centre there was an outpatient—a young post-graduate at a local higher educational institution—who had a small pigmentary tumour on his face removed at the polyclinic for purely cosmetic reasons. The surgeon had no doubt that the tumour was benign; the localization was inconvenient for a vast cutting of tissues, and the operation was conducted within the minimal space. Histological analysis was not conducted, or if it did take place, the results produced by the histologist and the initial preparations were lost, since the operating physician, suffering from excessive optimism, did not pay attention to them. The patient, his mother, and wife were made to understand that recuperation was guaranteed. The necessity of an elaborate and opportune consultation with the specialist was not emphasized.

Therefore, when in a half year's time the patient found enlarged lymph nodes on the neck, he and the doctor who treated him took it as a completely new illness—cervical lymphadenitis. It was only the failure of rather prolonged physiotherapy that unfortunately made not the doctor, but the patient's mother, turn to the oncologist for help. The metastasis of melanoma was established, and the entire situation of the patient's state of health presented itself in quite a different light. The disease was rapidly progressing, and the hope of complete recovery was lost. At the same time, as a result of this tragic event, not only the patient's family, but their friends and acquaintances, irrevocably lost their faith in medicine, which unfortunately, was not unjustified.

Errors of this kind in the doctor's behaviour give rise to the urgent necessity of looking for redemption from cancer in non-medical, or the so-called non-traditional means of treatment.

The formation of moral and ethical principles of treatment took place not only (and not so much) in compliance with instructions and oaths, but because of the living example of older generations.

Many years ago the remarkable Russian doctor Nikolai Petrov published a small book and laid the foundations for the scientific study of the required behaviour of medical personnel towards patients. The

word "deontology" which he introduced came to be widely used and over the following decades quite a few books and articles on deontological subjects were written, although the problem of the complex relationships between doctor-patient-relatives remains not only significant and of current importance, but vital in all respects. Here are never-ending general problems, and that which is new and introduced into a life that is always moving at a rapid pace and changing views, positions and demands of people.

In what follows we have an example showing a change of view. For thousands of years death has been regarded as the irrevocable loss of life, and people accepted it. Some unhesitatingly, others gradually, and there was nothing to be done about it. Nowadays, however, resuscitation, or bringing someone who is practically dead back to life, has become the routine duty of a doctor. Moreover, failure to resuscitate is regarded by many as a sign of the doctor's professional incompetence. There has been much written about the achievements of current medical science that faith in the inevitability of resuscitation or rescuing the patient's life is something quite usual now.

In this connection the following precept has been ingrained in human minds: "If the patient died, someone is responsible for it."

An extreme form in which this kind of attitude towards the subject of our exposition was manifested can be illustrated in a complaint for a therapist, who was called to see a middle-aged man who had suddenly fallen ill. He arrived as soon as he received the call and detected a serious heart attack. He remained with his patient and asked the latter's wife to telephone a special "ambulance". In a few minutes the wife returned, but the patient had already died, although all measures to save his life were taken. The wife of the deceased wrote in a complaint: "How could it have happened that in our country a patient died in the presence of a doctor?!"

This is the faith in medicine that we see today. The only exception is that many people do not think that we should fight tooth and nail for the life of a patient who has a malignant tumour.

Should we struggle for the life of a cancer patient? In connection with this question I can mention a case that shows the degree of optimism on the part of the oncologists and the war that the people of our profession wage against the fatal outcome.

A famous surgeon was paid a visit one day by his old friend, a doctor with whom he had begun studying surgery and oncology. On account of a serious skin disease of the hands, one of them had to leave the operational work. This doctor who was devoted to surgery, found his place in life

in anaesthesiology—the science of relieving pain. And again, after an interval of many years, the two friends began to work together: one at the anaesthetic apparatus and the second at the operation table. They trusted each other implicitly. The anaesthesiologist asked his friend the surgeon to examine his uncle. The patient was emaciated and not young. The diagnosis was crystal clear: cancer of the upper section of the stomach, and long before the probable death of cancer the patient was threatened with the death from starvation. It was decided to place the patient in the ward and prepare him thoroughly for a large, complicated and dangerous operation. Three days passed. The surgeon was attending a meeting of the Scientific Council in the building that was situated next door to the clinic when he was called to come there immediately. He hurried there and found his friend's uncle pale, arterial pressure low, and other obvious signs of a serious gastric haemorrhage. After a brief examination and a discussion with the members of the staff it was decided that the patient should be operated on.

Hope of saving the patient's life was not great; the risk, however, was enormous. What was to be done then? When you operate on a patient in connection with the bleeding from an ordinary gastric ulcer, the danger is also there, but one thing is certain: if the patient survives the opera-

tion, he will live for a long time. This patient had cancer. It could have happened that during the operation the surgeon would be confronted with a tumour that could not be removed, or such metastases which make any hope of complete recovery no more than wishful thinking. What could save the man was only a radical operation. The blood vessels in the stomach are such that even when all the routes are blocked, bleeding from the tumour cannot be stopped. In moments like these the unwritten law in medicine ALL OR NOTHING comes into action. It is either a radical operation or death from bleeding within 24 hours. If the patient were not operated on, who could say that he died because of an operation? All these things do not come into mind for the first time. In the life of the oncological surgeon there were victories over death—the perpetual opponent, as well as frustrations very hard to bear indeed. It is not without a good reason then that sometimes at night the surgeon keeps thinking about the patient who had recently died, while his wife says to him: "Don't die together with every patient. Don't forget that we need you, so do the other patients."

But, as the wise Russian saying goes: "The eyes are frightened, but the hands do their work." There is no time left to think of the consequences. The patient is under anaesthesia, the assistants are ready,

and the customary professional stereotype forces out everything except the operation field and the fate of the man.

The abdomen was opened and a large tumour in the upper part of the stomach was discovered. The nearest parts of the intestine were full of fresh blood. The diagnosis was correct. The tumour was technically quite removable.

Now everything depended on speed and efficiency. It was a very serious case, and the operation had to be performed in the shortest possible period of time, the more so that the replacement of the blood that was lost would become efficient only when the stomach was removed. The operation was in full swing and "bridges had been burnt". In the operating room, to say nothing of the given situation, when there was no place for any nervous outburst we heard the calm voice of the anaesthesiologist: "Check the heart." The pulse was checked through the diaphragm—no heartbeat. Cardiac massage through the diaphragm was useless. Medicine was introduced into the heart without any result either. In such cases nature allots only three or four minutes. Even if they managed to get the heart "going", the consequences would still be bad. The insufficient supply of oxygen will stop the functioning of the cerebral cortex, and the patient will not die immediately, but soon.

We needn't dwell on all the things the

surgeons and anaesthesiologists have to deal with in those numbered seconds, since the dramatic situations in the operating room, particularly in those cases of open-heart surgery which have recently acquired a specific literary cliché. "A Heart in the Palm" and "A Second Life" are customary headings of articles and essays on successes in surgery. We, however, have lived through much more dramatic events.

In short, the heart began to work, and the operation was successfully brought to an end.

Many years have passed and after greeting the New Year, the old friend never fails to pass on to the surgeon season's greeting from his uncle. What else could anyone wish for in life? Much is undoubtedly required, though first and foremost it is the optimism and trust in the profession of a doctor who is endowed with the gift of saving patients who have such serious forms of cancer. This is what gives extra strength to go on with the struggle.

The struggle becomes ever difficult, especially if there had been many doctors already who tried to save this man but failed. There is a category of particularly serious patients who, for some obscure reason, are concentrated mainly in the central metropolitan clinics and institutes. Everyday contact with these patients creates a work style of its own, a very special kind of carefulness, although from time

to time there occur events which call for strenuous effort, unusual action and great confidence in the justification of what we are concerned with from dawn to dusk.

But what is really frustrating is the patients who could be saved, or who we could try to save, but who turn to the charlatans and madmen who consider themselves to be geniuses, having discovered the panacea for all the diseases.

Thus, in all the efforts of medical science and public health institutions as a result of their inadequacy as well as the errors, especially deontological ones, made by the doctors, there emerge objective conditions which drive the patients into the direction of anti-scientific, for want of a better word, quack doctors.

In the words of Academician V. M. Zhdanov, the viability of pseudo-scientific medicine and success of its proponents are due to the psychotherapeutic effect of their "treatment". It is quite natural that cases of this kind are advertised by the quack doctors themselves and distributed among those privileged to become their patients. The infrequent achievements of psychotherapy are counterbalanced by the health and life of a much greater number of people. As far as psychotherapy is concerned, its scope of application is rather limited, in spite of all its significance.

It is noteworthy that these "specialists" are, as a rule, made popular by the non-

specialists who also take it upon themselves to lend them their support. Zhdanov cites the following typical case:

"I remember a talk I had with some functionary of high rank, who tried to persuade me to support a certain quack doctor who treated cancer patients. Since the activity of this "specialist" had by that time been prohibited, my interlocutor asked me to render that man the necessary assistance (at that time I worked at the USSR Ministry of Public Health); he tried to justify his request by saying that the quack doctor had actually cured a large number of people whose cases were regarded as hopeless. On my part I was patiently proving to him that investigation into the activity of this man showed quite convincingly that the quack doctor had been responsible for the death of many patients who could have been saved. When I saw that my argumentation was of no avail, I said: "All right. Let's do it this way. A favour for a favour. I know a plumber who has built a rocket for a flight to Mars. Could you help him put the finishing touches on his invention?" "You are joking." I saw that the man was hurt. "I am indeed!" I answered. "But do you expect me to believe that you are serious? Do you really think that the human organism is less complicated than a rocket?" At this point our conversation ended.

### **The Overall Meaning of Pseudo-Scientific Myths**

Zhdanov's conversation with that high-ranking official did come to an end, but in newspapers, literature and life itself the subject has by no means been exhausted. This does not only refer to medical science in general and oncology in particular, but also to a large number of myths that emerge around various sciences. Sometimes these myths are refuted by the most authoritative specialists and their commissions. But alas! Many a commission that has authentically established the truth does not convince quite a few people.

For instance, in 1968 the commission headed by the famous physicist E. U. Condon comprising 37 scientists presented a 1,485 page account of "flying saucers" with 94 photographs. In the document it was confirmed that the available data are by far inadequate for acknowledging the hypothesis concerning the creatures from another world. "There is no evidence that can justify the assumption that creatures from another world have entered the confines of the Earth's atmosphere, and so far there have not been enough facts which would make it possible to determine the trend of further research." In the same document it was written: "An elaborate study of the materials that were at our disposal enabled us to arrive at the conclusion that the

ensuing investigations of UFOs could hardly be regarded as promising for the benefit of science."

This most authoritative decision remained unheeded, and only ten years later was made public. One West German magazine published a statement by the American astronaut Leroy Gordon Cooper, Jr., that rational beings from other planets were regularly visiting our planet with the intention of establishing contact with people. The astronaut went on to say that during his space flights he met various kinds of spaceships.

However, it was soon discovered that Cooper had not come into contact with anyone in space. He then made it quite clear that the words attributed to him were nothing but a lie and sheer nonsense. Nevertheless, those believing in "flying saucers" remained adamant in their conviction.

Another example tells us of a certain G. Adamsky who wrote several books devoted to "unidentified flying objects". His own testimony of meetings with the inhabitants of another planet, their appearance, way of life, etc., was one of the most convincing testimonies since it was a person who narrated what he had personally seen. And then came Yu. V. Platov's statement in 1983: "As was acknowledged by G. Adamsky himself not long before his death, all events that had been described as part of

his own experience were thought of and written by him as works of verbal art pertaining to the so-called genre of science fiction. But, since he could not find a single publisher who would care to have his stories printed, he began to give a realness to the events in which he had allegedly been a witness. However, he went a bit too far as can be seen from the results of his literary exploits."

Nevertheless the publication of the myths about flying saucers continue to appear. Moreover, any disparagement of non-scientific, or to be more accurate, anti-scientific methods in medical science is confronted with a hostile resistance and accusations of lack of objectivity and the exertion of pressure. This is precisely what Academician A. B. Migdal determined as traits of aggressive pseudo-science.

Probably any sensible person, especially after reading this book, will not need any comments at all. And yet I cannot but mention that there is no such thing as two types of medical science: the official, or professional study of medical phenomena, and the "innovative", or "new" kind of medicine. What actually does exist is a medical science based on knowledge which has been acquired by mankind, tested, and yields a tangible effect each time it is applied by an experienced and informed physician. There are also various quack doctors, charlatans, as well as assiduously

minded people who can sometimes render certain assistance when it comes to functional disorders, particularly of hysterical origin.

The unscrupulous publicity, and the filling of a gap in medical attendance that emerged as a result of social factors, conditioned by the unsatisfactory activity of medical establishments or inadequate qualification and skill of doctors are all responsible for the spreading of "paramedical specialists".

### Vaccine

The above may well find its expression in an account about a vaccine proposed by A. S. Troitskaya. In the following the reader will become acquainted with the background story of a misconception in science which had received unnecessary and hazardous publicity resulting in unrealized hopes and great suffering.

The following letter addressed to a certain very high official source is yet another testimony of what has previously been discussed:

"News has come from Kaluga that the regional public health department issued an order that the laboratory of experimental veterinary studies, known as A. S. Troitskaya, Cand.Sc. (Med.), laboratory, would cease to function starting February 10, 1980.

This information has had an astounding and frustrating effect on us, a group of

patients suffering from malignant tumours. We Muscovites are people of different age groups, social positions and sex who are afflicted with the same misfortune—we are doomed to die in anguish unless an agent is used that could cure us. This preparation does exist; at any rate many of those who have tried it find either alleviation or the cure itself.

The name of this agent is Troitskaya's autovaccine, which each of us has been receiving gratis from the laboratory in Kaluga over the period of time (from several months to a number of years).

Owing to this vaccine we have enough strength to live, work for the benefit of our country and support our own families. The order to liquidate this laboratory crushes our hopes of life and deprives us of any opportunity to be useful to society.

Official medicine has for a long time not recognized Troitskaya's vaccine and over many years has persecuted and disparaged the laboratory, asserting that the method of Troitskaya's vaccination was not scientific.

However, the criterion of truth is practice, or experience, which has been amply exemplified in that Troitskaya's autovaccine has saved and continues to save a large number of people.

It is our firm belief that the persecution of Troitskaya's laboratory is exactly the same kind of flagrant misconception as

was the case in its time with the rejection of the Mendel-Morgan theory, which resulted in Soviet genetic studies being thrown back decades in its development.

We are convinced that the time will come, and if no favourable conditions are created in the Soviet Union for an unbiased study of Troitskaya's method and its development, it will find its adherents in other countries, and as has often been the case until now, we shall have to buy this preparation for the treatment of our people in hard currency.

This autovaccine has never done any harm to anyone; quite the contrary, it has brought relief to many a sufferer.

Against this background the order of the public health department in Kaluga which was presumably based on an initiative from the USSR Ministry of Public Health seems to us to be totally lacking in humanism.

We ask you to take measures so that the decision to stop the functioning of Troitskaya's laboratory could be rescinded and that the laboratory could be allowed to go on with its highly humane work."

The letter makes us stop and think, doesn't it?!

The author of the present book was one of the members of the commission that dealt with the suggestion advanced by Troitskaya and, therefore, is in possession of authentic and factual data. This material

ought to be published at least for the simple reason that this vaccine now and again gives rise to so many heated arguments. Thus, to use the cliche of scientific treatises, some words should be said in connection with the state of the art.

Almost from the very beginning of the active functioning of "microbe hunters" scientists have begun to search for the cause of the stimulation of cancer. It has seemed to be exceptionally absorbing to find the microbe, create a prophylactic or medicinal vaccine, and once and for all solve the problem of this devastating disease.

To prove the infectious nature of any disease—already in the middle of the nineteenth century—it was necessary to carry out an experiment answering to the demands of Koch's triad: in all cases of a disease there has to occur one and the same microbe, which when inoculated in the culture media always behaves in the same manner (i.e. has the identical morphological and physiological characteristic features). When experimental animals become infected with these microbes, it is bound to cause the disease that is morphologically and clinically quite similar to the illness which affects people, in which the microbe under investigation was produced. It should be mentioned that for more than one hundred years this stimulation agent of cancer, which would be correlated with the require-

ments of Koch's triad (the triad of the great microbiologist, who established the infectious nature of cholera and tuberculosis), has never been discovered by anyone. It is natural that to any unprejudiced scientist it has become clear that cancer is a disease of a non-infectious origin. But not all the scientists share this opinion! Let us go back to the state of the art that has been studied by Professor V. V. Gorodilova in detail.

The microbiological research into malignant tumours began in the 1860s and were confined to the morphological study of the microflora of tumours and the growth of microbes in the culture media. At the end of the nineteenth century there was already a copious amount of information on the properties of microorganisms that were extracted from tumours. In 1888 Schaurlen extracted from the cancerous tumours a microbe\*, considering it to be the causative agent of cancer. Senger (1888) verifying Schaurlen's data, extracted from the tumours the bacteria which he referred to as harmless microorganisms that are widespread in nature. He did not confirm their role as the stimulation agents of cancer. The possibility of extracting microorganisms from cancerous tumours of man was shown in the works of P. Baumgarten (1888),

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\* The microbe was called Krebs bacillus—cancerous bacillus.

P. I. Kubasov (1889), M. G. Kurlov (1894), and other researchers; but they did not confirm the role of the extracted microbes in the origin of cancer either, since they did not correspond to the principles of Koch's triad. In a suspended drop of blood and lymph taken from a tumour, P. F. Borovsky (1897) noticed the movement of formations of a pear-shaped form. M. G. Kurlov tried to make use of the newly discovered "corpuscles", which received the name of "Kurlovian corpuscles", for the diagnosis of cancer and obtaining an immune sera for them to treat people who had cancer. These endeavours, however, remained unsuccessful.

At the World Oncological Congress in Madrid in 1901 Doyen gave a sensational report on the extraction of a special microbe from cancer patients. He had developed a method of preparing a vaccine and the treatment of patients was undertaken. He prepared "strong" and "weak" vaccines. He treated a total of 242 patients who had been operated on before. Recovery was registered in 18.5 per cent of cases, improvement of the general state in 37.3 per cent of cases, and there were no results for 44.2 per cent of the patients. The author noted that after the first introduction of the vaccine, the patient developed a temperature and experienced a painful reaction. He pointed out that there were contraindications regarding the

use of the vaccine: an increase of the lymph nodes, the progress of the tumoral process, a large size of the initial tumour, and emaciation. The vaccine was unsuccessful in all these cases.

In 1924 at the Koch Institute in Berlin P. Mayer extracted from breast cancer the polymorphic microbe "MP".

Even such an experienced and competent oncologist as N. N. Petrov wrote in 1924 that those experiments seemed to him convincing, though in the later years P. Mayer's investigations were not confirmed.

In 1932 Bremer extracted microorganisms from the blood of cancer patients and from tumours. He worked out the conditions for extracting microorganisms in blood culture, but the suggested method was carefully verified and the microbe was found only in 7.7 per cent of the analyses. In 1950 and 1951 Gerlach discovered in 147 newly born and nursing babies the microorganism known as mycosis, which was exactly the same as what he had found in the blood of the cancer patients. The very same microbe was found in many women who had the microbe for many years, but it was later proved that the microbe had nothing to do with cancer at all. In 1953, at the International Anti-Cancer Congress in Rome, E. Alexander-Jackson made a report concerning the extraction of a polymorphic microorganism from the cancerous tumours of animals and man, and presented the

characteristics of its properties. Any evidence concerning the affinity of this microbe with the emergence of cancer has been recognized as untenable.

As far as research in the Soviet Union is concerned, the most prominent works are those of M. M. Nevyadomsky, who wrote in 1961 that the efficacious therapy of cancer should be based on the experience of the Russian oncological scientific school, its demands to extract cultures of a causative agent from each type of tumour and to create specific vaccines from them. "The development of vaccine and serotherapy of cancer will put the finishing touch on the efforts of man in his struggle and victory over cancer" (Nevyadomsky).

Convinced as Nevyadomsky might be, there has not been anyone who has managed to substantiate the infectious nature of cancer. A very special place in overall research belongs to V. A. Krestovnikova, who at the end of 1950s paid particular attention to the study of the properties of the microorganism that was extracted from the blood of cancer patients. Under her personal observation there were 92 cancer patients with tumours of various localizations (mammary gland, ovary, stomach, lungs, lip, upper jawbone, and kidney). Positive cultures were found in 73 patients. The maximum degree of inoculation of the microbe was discovered in the case of the breast cancer and the cancer of the ovary.

Out of 67 blood tests of cancer patients, 19 cultures of microorganisms were extracted. One of the 55 donors had also yielded an analogous culture of the microbe. In the opinion of Krestovnikova this microbe is a frequent associate of malignant neoplasms, and the task was set to determine its role in the development of cancerous tumours. It was also necessary to carry out its identification against the background of the collections of microorganisms that are available now and that have been preserved from past research (Gerlakh, Alexander-Jackson and others), and that are kept in the World Collection of Strains in London.

In Krestovnikova's article it is pointed out that when animals (guinea pigs) are infected with polymorphic microorganisms, they experience a feverish state, during which some of them die.

Krestovnikova obtained data that the polymorphic microbe extracted from the tumours and blood of cancer patients is also found in the case of some inflammatory gynecological processes of women, in the intestine, and in other parts of the human organism. Concluding the analysis of research conducted over many years, Krestovnikova came to the conclusion that this microorganism was not harmless for sick or healthy people, that in the future it would be necessary to develop a method for diagnosing the infection caused by this

microbe, as well as a method to fight against it in the case of local inflammatory processes and cancer. Krestovnikova thought the elimination of the **infection concomitant with cancer** caused by the polymorphic microorganism could facilitate the course of the basic cancer process.

Thus, Troitskaya did not begin from scratch. Research into the microbiological nature of cancer by the time she began her work had already experienced a century of admiration, hopes, and frustrations. What did Troitskaya do then? This must be examined very seriously because she was not a quack, but a conscientiously misled scientist, and because her publications became so popular and she was implicitly trusted by a few credulous people, that the closing of the laboratory was regarded as a crime against humankind.

About the work of Troitskaya. First I must apologize to my readers for the following rather long quotation from her work published in 1979, which I shall try to clarify afterwards. In the article written together with A. A. Kopeikina and O. N. Babak, Troitskaya says: "Our first publication concerning the extraction of bacterial hemocultures was issued in 1959 prior to the emergence of similar research in Soviet scientific literature. In it we described the 30 cultures we obtained during the inoculation of blood of 30 oncological

patients with a clearly expressed bacteriae-mia on beef-extract broth, with the addition of the stimulating medium.

In the following years, from 1960 to 1973, using the same method, we had extracted from 180 patients 170 hemocultures (94.4 per cent) in various localizations and types of malignant tumours: carcinoma of the stomach—44, lungs—36, the mammary gland—32, uterus and ovaries—18, other localizations—8, sarcomas—12, melanomas—10, and leucosis—10.

In 1971-72 a laboratory concerned with the research of leucosis of cattle was organized in the city of Kaluga. On the basis of this laboratory we, together with V. A. Barkhudaryan and V. T. Belenkov, inoculated the blood of leukemic cows: in 67.6 per cent of the cases cultures identical to each other were extracted. Some of them are kept in the laboratory's museum.

A great percentage of the inoculation of cultures from the blood of patients (94.4) and leukemic animals (67.6) shows that they have a marked degree of bacteriae-mia. During the extraction of hemocultures it can be successfully used for early diagnosis together with our special diagnostic method of the microscopy of thick drops of blood, in which we find coccoid microbic forms—globular corpuscles.

We examined the methods of extraction and the properties of hemocultures in detail in a previous paper. What we would like

to do here is merely to indicate a complete identical character of biochemical, tinctorial and morphological properties of hemocultures extracted from leukemic cows as well as from people suffering from malignant tumours.

The electronic microscopy of hemocultures extracted from patients and leukemic cows has revealed that they are absolutely the same...

The oncogenic properties of some hemocultures extracted from people who had cancer, sarcoma and leucosis have been found in an experiment on white mice and Wistar rats. From 1963-1967 we described the positive results with histologically confirmed tumours of cancer and sarcoma in mice and leukemia-like diseases of rats with tumours and numerous metastases in the interior organs."

According to Troitskaya the very same properties of causing tumours were characteristic of some of the cultures of microbes extracted from leukemic animals. During the microscopy of the drops of blood and smears from the tumours of experimental animals Troitskaya seems to have discovered a large number of rounded corpuscles situated within the leucocytes, which she unambiguously calls "the coccoid microbial forms". Further in this article the information cannot but astound the reader:

"In 1972 we carried out the preliminary experiments in which we infected plants

with hemocultures from leukemic cows and people who had cancer. Thus we received tumour-like growths on tomatoes, thorn-apples or jimsonweed, and sunflowers. Some of the outgrowths yielded cultures that were the same as the original ones (original terminology—*Yu.G.*).

We began to study the immunogenic properties of hemocultures in 1960 in the experiments with Wistar rats inoculated with sarcoma (Benevolenskaya's strain). The preliminary immunization had established a prophylactic anti-tumoral action of the prepared rat autovaccines. They prevented the experimental animals from developing the inoculated tumours, whereas the non-immunized rats perished as a result of huge sarcomas.

The vaccinotherapy conducted in the case of eight rats with small tumours led to a complete dissolution of the neoplasms. With the eight animals that had large sarcomas it just temporarily retarded the process. This showed that vaccination was necessary as early as possible, until the pathological changes went too far.

The data of prophylactic immunization and vaccination have been used by us for the autovaccinal treatment of 72 oncological patients with various forms and localizations of the disease. Twenty-five patients had the third stage of the disease with metastases, 38 had the fourth stage with

a large number of metastases in the bone and organs, and 8 patients were in the terminal period with a marked metastatic spreading.

The generally accepted treatment of all the patients—operation, irradiation, and chemotherapy—did not stop the process.

Prior to vaccinotherapy in the course of blood tests, microscopy of thick drops and blood cultures, all the patients had revealed bacterially expressed leukopenia, a decrease in the number of erythrocytes and hemoglobin, as well as a high ESR. All patients had undergone vaccination, which consisted of 5, 10, 20 courses of treatment depending on the seriousness and stage of the disease. Out of 72 patients, 26 (36.1 per cent) were cured and have clearly survived for over 5, 7, 10 years. With 38 patients (52.8 per cent) there occurred a stable improvement of health, the metastatic tumours dissolved, and the workability was partially restored. These patients receive the sustaining vaccination, which consists of one or two courses a year. It became possible to prolong the life of eight patients in the terminal period (11.1 per cent) for 4, 8, 12 months on the average."

If all that has been written above had corresponded to the actual state of things, the problem of cancer would have been solved in 1974. Unfortunately, this was not the case.

Let us go a little bit deeper into details

and interpret the text in a language that would be comprehensible to all. First and foremost, the cancerous tumours of man and the leucoses of man and animals are quite different illnesses which refer to the same class of disease in that only one feature is concerned—the wanton reproduction of cells. In regards to the leucoses of man and animals, all we can say is that their viral origin can be traced most distinctly, whereas such dependence for cancerous tumours has not yet been cogently illustrated by anyone, although the attempts to prove it have been innumerable indeed.

Then, according to the materials that are cited in Troitskaya's article, it turns out that the microbes she and her colleagues discovered seem to completely meet the requirements of Koch's triad: identical microbes were obtained from almost all the patients. Animals were injected with them and they developed a very similar illness, yielding exactly the same microbes.

All this is very interesting although absolutely not convincing because, to say the least, one and the same microbe was obtained from people and animals who suffered from different diseases!

Not a microbiologist, however, I must quote an authority, who carried out an examination of the microbiological aspect of Troitskaya's research after acquainting himself at the laboratory with the materials that had been investigated.

The expert wrote that there was no proof that Troitskaya had regularly extracted from the blood of oncological patients a certain type of bacteria to which she had been attributing the properties of the causative agent or the associate of malignant tumours. In what follows we have the concluding words of this particular part of the appraisal:

"It goes without saying that A. S. Troitskaya did not produce any evidence of the connection between these cultures and cancerous diseases in either a private talk we had, or the articles in the medical publications with which I had acquainted myself."

What should also be added here is that the second piece of evidence concerning the specific character of microbes, demonstrated by Troitskaya at the laboratory as something fairly special, did not seem specific to the expert at all. Another factor which was noted by the expert was that Troitskaya remained totally heedless in her research of such a compulsory component as scientific control. The discovery of a cancerous microbe could have been more or less cogent if the same microbe had not been found in the analysis of blood and tissues of the same number of patients suffering from other diseases, or in healthy people. This proof was not presented either to the expert or to the scientific world in general. Hence, the first component of Koch's triad did not take place.

The readers can be reminded that in her article Troitskaya wrote about spherical corpuscles that were found in the leucocytes (she called them globular corpuscles). It is common knowledge that leucocytes constantly, particularly in pathological conditions, reveal various types of granular inclusions, which in general are considered to be the normal ingredient of white blood cells. This is where the expert detected a very essential detail: the means employed in preparing the blood for analysis can by themselves be conducive to the emergence of inclusions of this kind in the leucocytes. This fact as well as a host of others can serve as proof that Troitskaya's method of conducting the test was on a low if not altogether primitive level as far as its technology was concerned—especially the experiments meant to produce tumours in laboratory animals (rats and mice). The study of the expected curative effect resulting from the use of a vaccine was not provided with any rigid scientific control.

Finally as a result of an objective professional microbiological experiment, the following was concluded:

"In the light of the data received and the contemporary ideas concerning the etiopathogenesis of cancer the continuation of Troitskaya's research is considered unadvisable and her vaccine must be excluded from the treatment of cancer patients."

Wishes have often been mistaken for

reality in science. And the person who stands behind each of such instances is not necessarily someone who is dishonest. He may simply be an enthusiast blinded by his own ardour. Try to bring it home to a bad poet or playwright that his art is worthless, especially if those in his circle are convinced of the opposite. In our case Troitskaya seemed to have served the jigsaw puzzle, as it were: articles were readily published in the journals, doctors were saying that the vaccine produced on the basis of the recently described theoretical analyses was quite efficacious with patients, and so on.

In this kind of situation it is difficult to believe that what you have at your disposal is an error rather than a discovery. The more so that it has often been the case in science when great discoveries were made not on the basis of a systematic study of the subject, but quite by chance, and even as a result of a mistake or some fallacy on the part of the experimenter.

In discussing Werner Heisenberg's unified theory of elementary particles, Niels Bohr said that there was no doubt that what they had before them was a mad theory. The question was whether it was sufficiently mad to be correct.

The example illustrating A. F. Lazarev's anti-somatotropic serum cited above shows that an erroneous theoretical premise can give rise to a concrete medicinal substance

that proves to be efficacious in a field that is quite different from what its author had in mind. For instance, Lazarev's preparations which occurred to be totally inactive with oncological patients found a certain application in clinical endocrinology. It is neither the time nor place to give them an assessment here. This example has been mentioned only to show that an incorrect idea can prove to be not wholly lacking in fecundity.

It was precisely this argumentation that had been used by the supporters of Troitskaya when they asserted that her vaccine was not only effective in treating cancer, but a lifesavor.

In order that the readers can understand more clearly how heated the dispute was, I would like to acquaint them with another extract from a letter addressed to a high-ranking authority.

"...Would you like to have a real sensation? Or is it not customary with us?

**273 people are doomed to painful death.**

They were deprived of Troitskaya's vaccine—their last medicine, which helped them for a long time (up to 10 years) to live and work.

These people and their relatives are in despair. They are all horrified at the thought that the vaccine will be finished.

In a small laboratory in Kaluga, 8 women were given the autovaccine. It was given to patients who had no hope to live at all

and were thus saved, who believed in the vaccine as the only medicine.

They worked carefully and with great precision and were quite unselfish in comparison with many others working in the field of medicine. The laboratory was called "Microbiological Laboratory of A. S. Troitskaya, Cand.Sc. (Med.)". Her vaccine saved people, but its production was terminated, and to please official medicine 273 will die. Order shall be restored; there is no vaccine, and they meant it. The Public Health Ministry sent a commission to Kaluga.

The conclusion of the members of the commission were naturally quite negative.

But the people... aren't their lives jeopardized? They are now writing letters to various official sources: they ask, they implore, they keep struggling for their lives!

But nobody has yet responded. The functionary whom we went to see gave us a boring lecture on the achievements of Soviet oncology, but promised nothing! Those who came to see him were the four mothers whose children had had the vaccine for many years. All the four children were dying, but now are able to work, study, and live normally.

It is impossible to remain calm listening to the tragic stories of these women who are told that the vaccine is scientifically not valid. So what? We believe in it no matter how non-scientific it may be. How then can we be deprived of our last hope?

But the vaccine is actually running out, a break of over two months is dangerous, those who tried doing it felt worse. So far no one's heart has trembled. There is every reason to believe that your heart will not tremble either, since official medicine is against the vaccine. Nevertheless, I did decide to write... what if there's a chance! Aren't we really talking about human lives?"

The letter, a real plea to the heart and a call to save people, contains two questions that have already been raised in this book:

1. A vaccine can help even if it is not theoretically substantiated.
2. It is not essential whether it helps or not; we believe in it, and that is more than enough.

Isn't it a fact that Jenner's vaccine saved millions of people from smallpox, though theoretically it found its substantiation only 290 years after it was discovered. Couldn't it be the same with Troitskaya's vaccine? Before giving an analysis of the possible effectiveness of the latter's vaccine, it should be mentioned that Jenner based his assumptions on the practical observations of how people, ill with a mild form of smallpox, become immune to it, don't contract it any longer, and consequently, do not die from it. In Troitskaya's case it is just the opposite. She approached a theoretical premise, which unfortunately,

was not substantiated. Hence, the given parallel cannot possibly be justified.

Preferring faith over knowledge remains the most essential question of many philosophical, predominantly religious, systems.

At this point it would be quite appropriate to mention the last part of Troitskaya's argument, i.e. the use of her vaccine in treating patients.

It is difficult to estimate the number of scientists and physicians who took part in analyzing the medicinal effect of her vaccine but the conclusion of specialists and commissions came to was unanimously unfavourable. **Not one of them came out in favour of the vaccine.** The repeated examinations were brought about only in connection with new letters and complaints. There is every reason to say that not a single means of treating the patients with malignant tumours has been subjected to a so detailed and objective verification as the one under discussion.

The author of this book, a member of one of the commissions, together with a group of highly qualified specialists, made a study of the initial medical documents of many Moscow patients, including all those mentioned in the letters and complaints as having been cured of cancer. A large number of patients were subjected to an additional examination and the microscopic preparations were reinspected

by the most eminent specialists in this field of medicine.

Many commissions went straight to Kalluga where they studied the case in detail. First and foremost they established that a unified and properly elaborated scheme of treatment did not exist; neither was there substantiation of repeated courses and intervals; nor the required instruction concerning the preparation of the vaccine and the taking of blood tests. Moreover, the vaccine, as a medicinal and prophylactic preparation, had not been registered anywhere, which is a flagrant violation of Soviet law. Medical documentation and observations of the treatment results were not conducted either. Therefore, all statements about the effectiveness of the given method of treatment are the result of personal impressions rather than genuine and serious observations.

During the laboratory's operation, the sanitary and epidemiological control, compulsory for all medical institutions, was not maintained. The prescription of the vaccine to the patients was carried out by a senior laboratory assistant with no higher medical education and no right to treat patients. The distribution of the vaccine was conducted without medical control, substantiation of the diagnosis, or medical documentation.

The vaccine was prepared from the blood of patients suffering from malignant diseases,

as well as from the blood of healthy people who had contact with those who were ill.

It is a scientifically established fact that before administering a certain treatment or prophylaxis to people, tests should be made first on animals. In Troitskaya's laboratory both these stages were taking place at the same time. We, however, shall expound the problem in the traditional consequence of events.

It should be mentioned again that Troitskaya suggested a method of diagnosing leucosis in cattle. By 1980 the veterinarians of the Kaluga region, where Troitskaya lived and worked, had begun to use other means of diagnosing leucosis in cattle that were incomparably more efficient.

Troitskaya's method of vaccination was carried out for medicinal purposes in an experiment on 20 cows ill with leucosis. In the case of an acute form of leucosis no result from the treatment had been achieved. During the subclinical stages a decrease in the lymph nodes and an improvement of the blood count resulted. However, this was followed by a rapid worsening in the health of the animal, eventually leading to a fatal rupture of the spleen.

For prophylactic purpose, according to Troitskaya, an experimental vaccination was conducted in two farms on a herd of about 100 cattle. It is difficult to evaluate the effectiveness of the vaccine since these animals had also developed leucosis.

Thus, the animals with leucosis failed to profit from either the method of diagnosis or the prophylactic or medicinal introduction of the vaccine recommended by Troitskaya. There seemed to be no ground for any publicity and mad inculcation of hope in the minds of people who were seriously ill. However, attempts at treatment did take place and, according to the information of the interested people mentioned above, were most markedly effective. For this reason the analysis of initial documentation, the examination of a large number of patients and the study of their fate, which was carried out by groups of authoritative physicians, specialists in oncology, presents what may really be called major interest.

In Troitskaya's laboratory, as has already been mentioned, instead of case histories there were lists containing the data on 294 people: names, patronymics, surnames, addresses (sometimes inaccurate), the diagnosis (an approximate one, as a rule). It was possible to obtain the initial medical documentation and genuine information on the fate of 167 people (129 residents of Moscow, 33 from the Kaluga region, and 5 from Leningrad). Out of these 167 people it was impossible to trace the results of 5 of them either because the address was wrong or because they had moved and could not be examined at the request of the members of the commission or the doctors. All

cases of deaths were checked at the registry office. What were the results?

Twenty-three patients with malignant tumours presented the most interest. They did not undergo any of the now existing forms of treatment except Troitskaya's vaccine. Twenty of them died in the course of 2-21 months, i.e. within the period that proves to be fatal for cancer patients who do not undergo any treatment. Three of the patients who were diagnosed less than a year before the examination were found to be in a serious condition and died as early as several months afterward. These 23 deaths were already enough to contemptuously refute the "tearful letters", but also in compliance with Soviet law, people are penalized who practice medical treatment without any proper education and administer non-certified preparations. However, this is too small a punishment. It turned out that 20 people who were regarded as cancer patients and received Troitskaya's vaccine **never had any cancer at all**. I repeat that during the examination conducted by experienced doctors these people, who in all the letters, telegrams, complaints, etc., were mentioned as those who had been cured, had actually never been ill with this disease in their lives. As far as the remaining 119 people were concerned, it was learned that they were actual cancer patients, as well as those suffering from other malignant tumours, who before re-

ceiving Troitskaya's "treatment" had undergone treatment at various medical establishments, including such contemporary methods as surgery, radiotherapy, and the use of anti-cancer preparations of directed activity. As a rule, most of these patients received combined treatment, with the courses often repeated. Out of these 119 patients 9 people died.

Since among these 119 patients there were people with the most varied forms of malignant tumours, it is hardly possible to present in a book of popular science series a detailed scientific analysis of the whole group. A more detailed description was given at a proper time and place. To exclude all doubts, I should like to cite only several figures characterizing the achievements of present day oncology.

Among those who had received Troitskaya's vaccine there was a considerable number of people who suffered from lymphogranulomatosis—a serious disease of the human lymphatic system. With a comparatively early diagnosis of this illness and the proper treatment of radiation energy and current medicinal preparations, no less than 85 per cent of the patients are cured.

It is not difficult to see that everything related to Troitskaya's vaccine is no more than one of those psychologically tragic cases. Irrespective of the number of individuals or entire collectives who believe in the vaccine, the facts reveal that the

elaborate study of the medical documentation of a great number of patients, and an examination of a few, confirms that Troitskaya's "method" cannot be applied either for diagnosing cancer or treating oncological patients, and cannot be recommended for further use.

The absolutely accurate conclusion made was that the uncontrolled "means" of diagnosing and treating oncological diseases which was not substantiated by either scientific research or clinical practice over a number of years, resulted in the disorientation of the population, further negligence of the disease, inopportune treatment, and the premature death of patients.

I have dwelt at such length on Troitskaya's vaccine not only because it represents an example of the conscientious scientific fallacy of a misled researcher. Academician P. L. Kapitsa considers that only 15 per cent of experimental ideas are justified in the course of any experiment, though most of them seem to be highly convincing at the outset. Presumably, this regularity is characteristic of not only physics, but also biology in which medical science is an integral part.

If the experimenter planned to see "corpuscles" and, under particular circumstances in the course of the experiment, did see them, he had to muster a lot of courage to understand his errors, distinguish the artifacts from facts, and what is most im-

portant—not allow his enthusiastic or unscrupulous associates to turn it into a public sensation, particularly if it has to do with people's health.

### **“Grafting”**

There are numerous examples of such “sensations”. One of them is well-remembered by the older generation of doctors and took place at the end of the 1940s. It all began with the work of Academician Vladimir Filatov, the famous ophthalmologist who used to transplant corneas and after whom the ophthalmologic institute in Odessa was named. Besides work in the field of diseases of the eye, Filatov made no minor contribution to the transplantation of skin, which, in the days of war and the postwar period, was immensely significant for the treatment and cure of the wounded, particularly when wounds and ulcers remained unhealed for a long time. Filatov developed the theory and practice of tissue therapy. He had every reason to assert that transplanting skin in cryogenic state stimulates a number of biological processes which lead to the healing of ulcers and dissolving of cicatrices. Filatov was not alone in this work; strict as the demands were then, afterwards and are nowadays, their effectiveness has never raised any doubts.

All progressed in a way customary to science: Filatov's methods had been the-

oretically comprehended, approved in experiments, and had done a great deal in curing many thousands of people. For this he was honoured with the highest titles and awards in this country and elsewhere.

It so happened that in 1945, at one of Filatov's lectures on tissue therapy, a doctor named G. E. Rumyantsev was present. At that time he worked as a head surgeon at a military hospital. As he wrote in his book at a later period, the lecture produced "an enormous impression" on him, and he decided to immediately take up practical work "along those lines". Doctor Rumyantsev demobilized, went to the Rostov region, where in 1945, in a village completely destroyed by the fascists, the district hospital had absolutely no facilities. There, in the course of three years, he "studied the theory (?—Yu.G.) and techniques of tissue therapy". He then began to popularize his method of tissue therapy, availing himself upon all accessible ways and means, with the result that in 1950 his book *The Tissue Therapy* was published.

The book is unusually interesting. It is astonishing that it could have been issued in the middle of the twentieth century and that many people believed in what the author wrote and suggested. Some words should first be said about the preparation of the material for grafting. Rumyantsev wrote (the author's wording is retained—Yu.G.):

"For tissue therapy it is necessary to take the tissue of large and small cattle at the time of slaughter or castration. From the moment the tissue is taken from the animals to the start of its conservation, not more than two hours in winter and one hour in summer can pass.

The tissue is placed into a clear glass jar, the bottom of which is already smeared with honey. The jar is then covered with a piece of gauze and put into the refrigerator at the temperature of +2-4 °C for a period of 7 days. In the absence of a refrigerator it is possible to place the jar into an ordinary ice box on a thin wooden plate on ice. The juice is removed on the third day and when given out. The tissue is washed with tap water and then autoclaved for one and a half hours at the pressure of 1.5 atmospheres." After that he described the technology of his primitive operation which presents no interest to the reader at all.

So far there are no theoretical problems. In purely practical terms Rumyantsev did not describe anything much different from the famous "lysates" of Charles Brown-Séquard.

In 1889 when Brown-Séquard was 71, he reported to the Parisian Academy of Sciences about the experiment he carried out on himself, which came to be widely known and caused exceptional interest.

Brown-Séquard did the following: he removed sexual glands from the rabbits and

dogs, and immediately, while they were still fresh, rubbed them with a small quantity of water, filtered the liquid and injected one cubic centimetre of extract under the skin of his hip. He did this once every 24 hours for quite a few days. The injection itself was not painful; a little pain was felt intermittently, but in the course of a certain period of time it became so excruciating that Brown-Séquard somewhat changed the procedure of manufacturing the extract.

Brown-Séquard dealt with these questions before, and twenty years prior to that period he conducted research on the impact of sexual glands upon the nervous system. With the aim of rejuvenation he suggested that old people should take intravenously the product developed from the masculine sexual glands. In general he greatly desired something that could be used to suppress ageing. The good results which the extract injections brought him inspired Brown-Séquard, and found its expression in his report to the Academy of Sciences.\*

"On April 8 I marked my 72nd birthday. My general state of health, which was excellent before, has changed over the past 10-12 years; it has gradually become much worse. Before I began the injections I was compelled to sit down after no more than half an hour's work at the laboratory.

And even when I did take a seat, I was

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\* Quoted by Hugo Glaser.

completely enervated after four, and sometimes, after one or two hours of work. After working in this manner for several hours at the laboratory, I used to come home so exhausted (this condition had already continued for several years) that shortly after a light supper I had to go straight to bed.

There were days when I was so weak that, in spite of my ardent desire to sleep which prevented me even from reading a newspaper, I would fall asleep only after several hours. On the second and particularly on the third day after the injections everything changed. I again found myself at least as strong as I was many years ago. The research I am doing at the laboratory hardly fatigues me now. My assistant could not conceal her surprise to see me working on my feet without the slightest wish to sit down. There are days when after working for three or four hours in the laboratory I spend more than one and a half hours after supper poring over my scientific papers, though I have not done this kind of work for the better part of the past twenty years."

As a physiologist, Brown-Séquard naturally tried to explain a change in his state of health by the propitious activity of injections. He associated this improvement with the strengthening of the bone marrow and the nervous system.

"Without giving it much thought or making any special effort I can almost run up

and down the stairs as was my habit before I was sixty years old. The dynamometer showed my increased muscular potential. Thus, after the first two injections the power of my muscles increased by 6-7 kilograms as compared with their former state. My digestion and the elimination of waste matter have considerably improved, although the daily amount of food I consumed remained the same. The intellectual work has also become considerably easier for me now as compared with what it was for a number of years, and I have managed to make up for the time I lost."

H. Glaser writes that Brown-Séquard knew himself that the encouraging results of this kind were undoubtedly to some extent the product of self-deception and auto-suggestion. Nevertheless there remained a fairly large number of facts to draw attention of not only the public at large, but also of the specialists to the experiment that involved a struggle against old age.

What Brown-Séquard had to say was welcomed throughout the world. However, due to a number of reasons his method could not receive any marked propagation. Be that as it may, it was the first attempt to use hormones for medical purposes.

Brown-Séquard's research was the first step towards the scientifically valid ways and means of hormonotherapy. But what Rumyantsev suggested in 1950 was somewhat different. In not too profound a review

of the literature he concluded with the following maxim:

"The analysis of the published data above gives us every right to conclude that the chemical nature of biostimulants\* has not yet been made clear and the factors conditioning their activity upon the organism has been studied, but not adequately."

There is every reason to suppose that what should have come first was the planned study of all the most unclear questions, to be then followed by application of the method in practice. But, alas! The following theoretical concept has been constructed: "The chemical composition of the biogenic stimulants and the mechanism governing the activity of tissue preparations upon a diseased organism has been poorly studied... The biogenic stimulants act upon the sick organism by means of enhancing the biochemical processes of all the tissues and organs, thus bringing into action all the protective means of the organism and its systems in their entirety."

With these theoretical premises serving as the starting point Rumyantsev employed this method in treating 1,183 patients within a short period of time. The author of this book has not gone crazy—this is the correct figure. It was actually one

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\* The hypothetical acting inception of the grafted tissue had been given the name biogenic stimulants long before Rumyantsev.

thousand one hundred and eighty three patients who had undergone treatment according to the "Rumyantsev method" over only 2-3 years, while the number of such patients in the whole country comprised tens of thousands of people. In describing the results of the treatment of patients, he (in the middle of the twentieth century) three times stressed the fact that he had neither the laboratory nor the X-ray facilities.

Quite frankly Rumyantsev wrote: "The results of the treatment were verified after different periods of time by means of personal examination and written answers to my questions from patients and medical establishments. Unfortunately, only a small part of the patients could be of use for further laboratory and X-ray examinations.

As a doctor, Rumyantsev tried to lend a scientific character to his book and cited clinical examples of the effectiveness of his method. The following is a description of one of those cases, concerning an ulcerous disease.

M., age 52, has been ill for 15 years. Gastric ulcer (Haudek's niche) was confirmed by X-ray. Seven years ago the patient was operated on (with suturing) because of a perforating ulcer. Over the past two years the pains have become markedly more severe. There appeared dyspeptic phenomena. Treatment at a health resort gave only a temporary improvement. In

March 1949 he came to the Bagayevskaya Hospital. As early as several days after grafting the pains began to decrease. In three weeks the pains had completely disappeared along with the heartburn and belching. The patient developed a very good appetite and gained 5 kilograms in weight. In November of that same year he had the second grafting and now (1950) he eats whatever he pleases, feels well and does not require any repeated grafting.

The analysis of this observation reveals Rumyantsev's flagrant incompetence in medical studies. If over the period of 15 years the patient had been suffering from a gastric ulcer (and not duodenal ulcer), which still remains uncertain, he had to be operated on due to the impending danger of a malignant transformation of ulcer. It was most probably a duodenal ulcer, since perforation occurs much more often than in a gastric ulcer. Characteristic of a duodenal ulcer is that it causes a worsening state of health in spring and autumn. Patient's first grafting was in March, and the second one in November. These are the periods when ulcer patients usually undergo hospital treatment. At the end of two or three weeks the seasonal exacerbation is alleviated, though next season the same treatment becomes essential again. This was exactly the case with patient M. After the treatment in March a repeated grafting was called for in November. This means that there had

occurred no changes in the course of illness. As far as the direct effect is concerned: "...in three weeks the pains had completely disappeared along with the heartburn and belching. The patient developed a very good appetite..." It usually takes place when the seasonal state of exacerbation is over, particularly when the patient stays in hospital for some time, remains on a diet, and has no contact with any primary factors that could disrupt his equanimity. The example is totally unconvincing and does not in any way speak in favour of Rumyantsev's grafting. When carefully studying his book (not reading, studying) one cannot find anything that would be more convincing. And this misled physician took up the treatment of patients with malignant tumours, and people actually trusted in him.

### **Turpentine Baths and the Treatment of Cancer**

Let us recall the book of doctor A. S. Zalmanov *The Mysterious Wisdom of the Human Organism*, which was published in 1958 and has now fallen into oblivion.

Alexander Zalmanov was born in Russia in 1875. After completing his studies at a gymnasium (secondary school) he entered the medical faculty at Moscow University. After the third year, having passed the so-called assistant surgeon's examination, he left the faculty on the pretext that he was

not satisfied with the level of the teaching of medical subjects.

In 1896 Zalmanov became a law student and, moreover, buried himself in the study of Russian and general history, as well as comparative linguistics.

In 1899 he was arrested and expelled from the University as one of the organizers of the All-Russian student strike.

After his imprisonment, deprived of the possibility to go on with the studies in Russia, Zalmanov went to Germany, where in Heidelberg he completed his medical education and received the diploma of doctor of medical sciences. Later, he received the same kind of diplomas in Russia and Italy.

During World War I Zalmanov came back to Russia and worked as commander and doctor of sanitary trains. Immediately after the Great October Socialist Revolution he was appointed chief of the Central Board of Health Resorts and chairman of the State Commission responsible for the struggle against tuberculosis.

Dr. Zalmanov later worked in various clinics not only in the USSR, but also in some of the largest cities of Europe. He died in 1964 at the age of almost 90. As Academician V. N. Chernigovsky once mentioned, he was a highly educated person with a perfect command of five languages.

His principal medical idea consisted in that it is first and foremost necessary to

draw attention to the support and stimulation of the natural protective forces of the organism.

Generally speaking, this idea, which does not give rise to any objections, cannot possibly be regarded as original. However, the author ardently developed it, and as is typical of many enthusiasts, became perseveringly misled and found himself a victim to his own ideas that bordered on the absurd.

The fate and talent, professional and polemic, of this man were not commonplace, and there is some reason to believe that he thought it all gave him the right to be exclusive. He wrote:

"The old house of classical medicine contains innumerable treasures. But they are scattered in the basement and the attic, forgotten under the thick layer of dust.

In order that these precious little bits of knowledge could be discovered, and that a certain choice could be made, one must be armed with the guiding ideas and a doctrinal colander to sift for the precious grains.

A conglomeration of marble is not yet a statue. A collection of impressions can hardly be called a thought. The whiteness of the marble and its cleanliness are required for the creation of a good sculpture. Impartiality and clarity of impressions are called for when it is necessary to make the idea clear and uncompromising.

The time will come when biologists, physiologists and physicians, broadening the imperfect vision, will be enthralled to grasp the wisdom of organism, with all its subtlety and resilience. A profound comprehension of the experience of life is bound to permeate into philosophy and science."

The question is raised quite seriously at the very outset. What remains unclear, however, is why philosophy is divorced from science.

But we needn't stop at that. Zalmanov wrote that in medical science people had been working for decades most strenuously though without any particular plan or method. On the other hand, genuine science, in his own opinion, is not merely an accumulation of discrete facts, but primarily the knowledge of interrelationships and specific biological laws (here and further Zalmanov's idiom is preserved.—Yu.G.).

What the author emphasizes is that the volume of the unknown in medicine surpasses the already discovered phenomena. The difficulties in the art of treating people are to a lesser degree conditioned by the paucity of effective means rather than by the use of them as such. It is necessary that we should sum up our knowledge, or specify our requirements, i.e. pigeonhole what we do know and separate it from what still remains to be discovered.

He wrote: "To unravel the phenomena

connection we often have to go back to the past. The thing that we ought to begin with is to learn how to forget what is not required. The paths of the past are crowded with fragments of numerous doctrines. The result—a particular mosaic of controversial ideas or the puerile didactism which we are witnessing at present. In spite of the great amount of medical literature, or because of it, we have a heap of remaining facts with no synthesizing ideas. Thus, literature stifles clinical common sense."

This is the state of affairs. Here criticism is a bit more serious than the statements made by those who know nothing about medicine and yet revile the "official" science. So writes an educated physician. He does not merely write with passion, but it is clearly a hostile attack on the foundations of present day therapy. As an argument he made use of the well-known clinical experiment carried out by Armand Trousseau, which consisted in that within the period of one year 50 per cent of his patients who suffered from the same disease were not given any medicine at all, while the other 50 per cent who had the same disease were treated with ordinary medicine. The percentage of those who were cured in both groups was exactly the same.

Now, before we go any further we should mention that Trousseau's experiment was conducted in the middle of the nineteenth century when, for instance, there was

neither asepsis, antiseptics, nor contemporary anaesthesia, when vaccines, sera, and active medicinal agents were still unknown. In the days of Trousseau the children's mortality rate resulting from diphtheria exceeded 50 per cent, while the death-rate from open tuberculosis approached 100 per cent. The cancer mortality rate was as high as the number of those who had contracted this disease. Was it possible to form any assumptions on the basis of these data in the middle of the twentieth century?

The history of medical science knows of examples that are comparable with Trousseau's experiment. Not long ago one group of Moscow scientists conducted special studies on whether it was possible to prolong the life of patients suffering from carcinoma of the stomach by using anti-tumoral medicine as a supplement to surgery. The other group of oncologists, in studying the impact of health resort factors upon oncological patients, placed the people who had been operated on for carcinoma of the stomach in an excellent suburban hospital, where they underwent a definite though not specific course of treatment. The results were exactly the same. Does it mean that Zalmanov was right, and the medicinal treatment of carcinoma of the stomach does not mean anything? The answer is an emphatic 'No'! In both cases the patients were subjected to a very thorough examination and in those cases when

relapses and metastases were detected they were excluded from the group under investigation to receive a more active, in particular, surgical treatment.

Moreover, the patients of both these groups received general recuperative treatment, which had undoubtedly influenced the duration of their lives. A more detailed analysis of all the data on a contemporary scientific level made it possible for professor N. G. Blokhina, who conducted the first series of investigations, to determine that the drug therapy after the operation was useful not with all forms of carcinoma of the stomach but only with some of its specific variants. I. V. Kolyadyuk, Doctor of Medical Science, who carried out the second analysis, laid the foundations of recovery for patients who had undergone the present day complicated and often traumatic oncological operation for carcinoma of the stomach. This is an example of "Trousseau's experiment" performed on a modern level and provided with scientific interpretation, which does not leave any place for doctor Zalmanov's judgements. However, he went much further and wrote that if dying leucocytes were removed from an organism with leukemia and malignant anemia, we should be able to help the patient survive his illness and possibly lead a normal life. But what can be said with certainty is that with these diseases, irrespective of how many leucocytes are driven

out of the organism, there will be no effect upon either the cause or the clinical condition of the patient, and if we confine ourselves to doctor Zalmanov's advice, the patient's death is inevitable. Now it is necessary to acquaint the readers with yet another quotation from Zalmanov's book so that anyone who has an education on the secondary school level will understand how irresponsible statements can be even if they are made by conscientiously misled people with three doctoral diplomas:

"Any illness is either a local or general stop in the movement of life: without blockage of the movement of extracellular liquids there is no disease as such. The cell suffers from hunger and thirst. Each case of emaciation, anoxemia, and each instance of its suffering are correlated with the retardation of extracellular liquids and the occlusion of discharge ducts.

Each little cell represents a microbrain, microlung, microintestine, microkidney, and "micropower station", the cells do not let sodium chloride penetrate into their cytoplasma and jealously guard the reserve of their potassium.

Our knowledge of cellular physiology and cellular metabolism are in an embryonic state; we know about the currents between the nucleus and cytoplasm, we have an approximate knowledge of different phases of cytoplasm; we also know that there exist electric currents, and we are almost

certain of the existence and activity of innumerable diastases in the life of a cell, which are responsible for intercellular microexplosions. We want to assume a certain hypothesis: it would be possible to regard various diseased conditions of the cells caused by anoxemia, the retardation of the intercellular movement of the liquid, the occlusion of discharge ducts, erosion, rupture, drying or edema of the cellular membrane, the retardation of humoral influx, as a result of the formation of diverse protein toxins, which enter the blood flow and the extracellular liquids.

We thus became convinced of this, after such prolonged medical activity, in the course of which twenty years we had collected classically clinical and patho-anatomical observations, and after 37 years clinical observations."

This means that there had been nothing prior to the days of Zalmanov. I. A. Alov, for instance, had not studied the most complicated processes of the division of cells in their normal and pathological states; there had never been A. M. Ugolev's discovery concerning digestion at the cellular level, nor the publications of A. I. Strukov on the pathology of the subcellular level, to say nothing about the great discoveries of the morphological substratum of heredity, the hypothesis of the oncogene and so on and so forth. All this exceeds Zalmanov's "theory"! Let it all rest upon the conscience

of the author and his editors. We will see what the author proposes as a method of treatment that is capable of rectifying all the deficiencies of modern theoretical and clinical medicine, physiology, pathophysiology, and biochemistry.

It is suggested that all or almost all diseases should be treated by means of hot turpentine baths. Moreover, recovery is guaranteed for both a calcaneal spur and cancer!

According to Zalmanov the situation of oncology is the following:

"There exists a vast amount of literature on the cancerous cell and only several insignificant papers about a human being suffering from cancer. This is exactly what accounts for the failures of all the efforts which have been made over the period of more than seventy years."

Further he proceeds on the assumption that tuberculosis patients do not suffer from cancer, and the opposite, for some reason nature has brought about an antagonism between tuberculosis and cancer. It should immediately be mentioned that this erroneous judgement originated in the middle and end of the nineteenth century and was based on the fact that those suffering from an active form of tuberculosis were young and reached old age in exclusive cases. At the same time cancer is the disease of people considerably advanced in age. People from the ages of 60 to 70 are 15 times

more susceptible to cancer than those whose ages are between 30 and 40. The idea concerning the antagonism of cancer and tuberculosis is one of the well-known medical myths completely refuted by the time Zalmanov's book was published. However, for the treatment of cancer he recommends introducing into the patients 30,000 microbial bodies, or Koch's bacilli. This is followed by concrete instructions containing recommendations of "purifying the organism from the disintegration products of a cancerous tumour", etc. Then the author comments rather modestly: "The difference between a normal and a cancerous cell was established long time ago. The specialists, however, derived no conclusions from this marked distinction. We have not the slightest intention of claiming to have at long last solved the problem of cancer. But we were guided by some of the impetus-giving ideas."

The two conclusions:

1. The theoretical conclusion that can be drawn is that the author was not acquainted with biochemistry. The professor V. S. Shapot (one of the most prominent biochemists in the field of oncology) wrote: "...There has not been a single case when it was possible to find in cancerous cells some kind of biochemically characterized specific protein, enzyme, or new enzyme reactions that were not typical of normal cells at this or that period of their ontogenetic development."

2. How fortunate it is that Zalmanov's book did not receive wide popularity and nobody demanded that special clinics should be opened to give patients suffering from malignant tumours Koch's bacilli and the subsequent or preliminary turpentine bath.

Presumably, the latter is not so difficult to organize, if someone took up the job with adequate zeal. Recall that the notoriously ignorant doctor Rumyantsev managed to introduce his method of "grafting" on a nation-wide scale. With all the money, effort, and time wasted on Troitskaya, Rumyantsev, Lazarev and the many other "conscientiously misled" people, who dexterously and persistently popularized their fallacies, we could have built quite a few clinics, studied a great number of problems, and saved many additional people.

### **A Legend About the Magnet**

One of the most viable legends of the oncological theme concerns the curative properties of the magnet. As far back as the end of the middle ages the famous physician Paracelsus resuscitated the old concepts of Galen, which referred to the all-healing properties of magnets, particularly in the case of cancer. He wrote that a physician who was in command of magnets could dispense with all the achievements of med-

ical science that had been accumulated since the days of Hippocrates.

The faith in the medicinal properties of the magnet has existed since time immemorial. Wearing magnetic amulets was quite widespread and considered to be a highly effective remedy. This belief in the significance of the magnet for the organism was also sustained by medieval doctors, who prescribed magnetic salves, magnetic powders and generally attributed to the magnet a propitious impact on the psyche of the patient. Paracelsus (16th century) created a theory about the impact of the magnet, celestial bodies and physical touching of some people on the diseases, amalgamating all these phenomena under the general name of "magnetic sympathy and antipathy".

All this information enables us to imagine that as early as the ancient times physicians were already acquainted with the importance of touching the body, patting, friction, and pressure as curative factors. The ancients were also familiar with the direct influence of one person on the psychological and physical state of another. These are the very same methods which entered into the fundamentals of the mystical study of animal magnetism, whose first proponent was the famous physician Franz Anton Mesmer. He became responsible for the branch of studies which is known as "mesmerism".

Mesmer (born in 1734), educated at the University of Vienna, first studied the in-

fluence of the planets upon man, then concerned himself with the medicinal activity of mineral magnets on patients.

What lay at the bottom of Mesmer's views were Paracelsus's ideas that a magnet could "draw in" any illness. In M. L. Linetsky's description, Mesmer provided a patient with two magnets, while he himself wore one around his neck. He magnetized, i.e. rubbed with a magnet such things as dishes, clothes, beds, mirrors, and musical instruments. He also "magnetized" water which he suggested the patient should drink and use for baths. He went so far as to magnetize the trees and the swimming pool in the garden, where those wishing to be healed would take baths. On one occasion, however, Mesmer came to see a woman patient and had left the magnet behind. Not wishing to frustrate the woman, he conducted the treatment, producing the impression of holding the magnet in his hand. Shortly the woman fell asleep, and when she awoke, the disease was no longer there.

Thus, quite by chance, Mesmer noticed exactly the same effectiveness resulting from the use of magnets and a mere touch of his hands and patting.

He gave up magnets and continued to treat his patients using only his hands. The success of this kind of treatment proved obvious in all respects. This resulted in the emergence of his theory of animal magne-

tism. Mesmer considered that there existed a very special kind of power—the living, or living-magnetic force where one man could influence another. Under the impact of the will power of a magnetizer it can be transferred to animate and inanimate objects, thus bringing about a certain form of activity. In Mesmer's opinion the whole universe is filled with a liquid, ether-like substance (fluidomagnetic liquid), conditioning the influence of the planet upon inanimate and animate nature, the impact on people, their nervous system, and that of one man on another. He called the power which makes people react to this liquid animal magnetism.

It is necessary to mention that it is precisely here where we can find the roots of the contemporary theory of the biofield and the labour of those practising extra-sensory activities nowadays. Their statements are astoundingly reminiscent of what Mesmer and his followers said and wrote two hundred years ago. However, if alchemy, on giving rise to chemistry, disappeared altogether, the theory of animal magnetism, after generating contemporary psychotherapy and hypnotic treatment, did not perish. It remains, along with astrology, one of the most resilient superstitions of people at the end of the twentieth century.

As with many uncanny and nebulous pseudo-scientific theories, it found a host of adherents. Mesmer's popularity con-

tinued to grow, his medical practice increased to enormous proportions, and the achievements of his treatment aroused general attention and interest.

On having deprived itself of the material substratum Mesmer's theory branched off into magnetotherapy, fraudulent magnetism and the scientific study of hypnosis. What gained the greatest popularity was fraudulent magnetism, which was not in the least surprising. The occupation involving fraud does not presuppose either education, profound knowledge, or even rudimentary decency. Nevertheless, the elements of magnetotherapy which we are interested in have been retained in the work of Mesmer.

In 1778 he moved to Paris, where his success became even greater. Since his hands could not meet the demands for magnetic liquid, proceeding from his own theoretical precepts, he would magnetize water, trees and also objects that served as medicinal talismans and acted upon the patients in the same way as his tactile activity. He hired assistants with whom he shared his magnetic power, and lastly, created the famous magnetic tanks, or special kind of tubs containing water, fragments of glass, pieces of iron, and covered with a lid. Iron bands, passing through it and out of the tubs, functioned as substitutes for the hands of the magnetizer. Around those tubs sat the patients, thus forming a chain and holding on to the bands. The

mysteriousness, semi-darkness, multi-coloured lanterns, enchanting sounds of soft music, singing and plush couches—all gave an additional touch to the atmosphere of these sessions. Everything act most powerfully on the feelings, mood, and imagination of the patients, who were subjected to fits of hysteria and crises, after which they often found themselves relieved of various functional disorders, such as paralysis, contracture, aphasia, and others.

Mesmer, drinking in the fame, was not averse towards deception. His offices were often occupied for purposes other than the treatment of patients.

This is how Stefan Zweig described the method employed by Mesmer in treating his patients: "As any physician competent in psychology, he enhances his authority by attributing to it an air of mystery. The rooms themselves convey an unusual atmosphere that fills the minds of those who enter the premises with palpitating anticipation. To create the effect of soft semi-darkness the curtains prevent light from coming in; heavy carpets on the floor and along the walls suppress any sound. From all sides mirrors reflect the golden hues of light, and the whimsically symbolic star signs serve to draw attention, yet not satiate it... In the middle of a large hall stands the "tub of health". It has the appearance of a big well. The people holding their breath are sitting round this magnetic

alter. A church-like silence prevails, with no one daring to stir lest the tension reigning in the hall should be disrupted. Now and again, in compliance with a certain sign, those present form the famous magnetic chain, which was adopted by spiritualists in the later period. Each person touches his neighbour with his finger tips so that the imaginary current, gaining momentum while passing from one body to another, would permeate throughout the whole congregation silenced with inspired awe. This grave stillness interspersed with nothing but hardly audible sighs is accompanied by the subtlest chords of some unseen piano or the soft choral singing from the adjoining room. Sometimes Mesmer himself plays his glass harmonica so that the dulcet rhythm could either appease the heightened excitation or increase it, if necessary, by accelerating the tempo... At last there appears Mesmer himself. Serenely engrossed in thought, he slowly enters the room, the majestic expression of his face radiating calm... Suffice it for him to approach his patients when a slight tremor echoing a remote jingle is felt in the chain. Our protagonist is wearing a long silk violet mantle, which brings to mind Zoroaster, or the clothes of Indian magicians... with his staff in hand he moves from one patient to another... One of them who Mesmer touches starts shivering with all the limbs in a state of convulsion. He

begins to perspire, his voice becomes hoarse, he sighs and groans... And as soon this first one shows the apparent signs of nervous tension, the other members of the chain experience the famous crisis that is bound to bring the healing effect... This is followed by a mass psychosis; the patients one after another fall into a state of convulsion..."

Over two hundred years ago (in 1784) the King of France signed a decree that the scientific institutions in his country were to look into the matter and determine whether or not such a thing as the magnetic living fluid existed. The commission included the most prominent scientists, such as: Franklin (physics), Antoine Lavoisier (chemistry), Baie (astronomy), Jussieu (botany), and Joseph Guillotin (medicine). The first four were great men of science. The names of Franklin and Lavoisier have remained for centuries. Dr. Guillotin has not fallen into oblivion either since it was he who had invented such the tool of execution. The following is the conclusion to which the commission came.\*

"The commission has acknowledged that the animal-magnetic liquid is inaccessible to any of our five senses, that it exerts not the slightest influence on any of its members, as well as on the patients who were subjected to this influence by the commission. Having proved with the help of posi-

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\* Quoted from M.L. Linetsky.

tive experiments that imagination without magnetism leads to convulsion, while magnetism without an imagination does not result in anything at all, we have unanimously arrived at the following conclusion concerning the existence and use of magnetism: there is nothing that can serve as evidence that animal-magnetic liquid does exist; consequently, this non-existing substance cannot possibly be of any required benefit."

The devastating conclusion could hardly have been given a more cogent wording. This seemed to put an end to all. However, it was not the case! Mesmer's followers continued to treat the most serious diseases (including cancer) with the help of magnetism for many decades. The following excerpt tells us how Vasser-Lombar applied magnetism in treating cancer.

"After some preparatory magnetization the magnetizer draws out, so to speak, the pain from its centre with the aim of extracting the impure liquids that sustain it; then he gesticulates in the direction from the root of the illness, as it were, with the intention of intersecting the bad liquid and extricating it. After that he ends the treatment by means of passes without any movements directed towards the centre of illness so as to alleviate the intensity of the disease and enhance the enervated current of life."

The fraudulent component in conjunction with the usual hypnotic suggestion does

everything to blur those feeble scientific endeavours that were undertaken by the proponents of "magnetism" in the eighteenth and nineteenth centuries.

In the period of reaction after the revolution of 1905 in Russia there burgeoned various forms of superstition and obscurantism. It was by no means accidental that precisely at that time Vladimir Lenin published his remarkably profound work *Materialism and Empirio-criticism*. In this book as well as in his numerous letters written at that same time to A. M. Gorky, A. V. Lunacharsky, Inessa Armand and many others, the great philosopher and revolutionary left no stone unturned to reveal the true value of pseudo-scientific ideas.

There would not be any particular reason to return to those dark days in life and society at the beginning of the century, if so many expressions of pseudo-science did not strikingly resemble the activity of the now functioning parapsychologists, ESP specialists and other parascientific and paramedical notables, who go so far as to tackle oncological diseases.

To make a long story short, I shall only touch upon the activity of Z. S. Bissk, one of the many protagonists of obscurantism, who called himself the magnetizer, professor of the School of Magnetism and Massage in Paris, and Corresponding Member of the France Magnetic Society.

In 1913 he organized in Kiev a publishing

house dealing with magnetism. The office was situated at 30 Proreznaya Street. Quite by chance it was precisely where the notorious "great blind man" Mikhail Panikovsky, in the novel by Ilf and Petrov, collected "alms", which he would share with the guardian of the law at the corner of the same street and Kreshchatik (the central part of the Ukrainian capital).

Therefore, the place for the publishers had been selected quite appropriately. What draws attention is the advertisement of that establishment, immediately helping to produce the desired atmosphere. The upper part of the page on which the advertisement is printed is taken up by a picture of a naked woman lying on stones in natural surroundings.

In 1913 the publishers issued a translation of the book written by a French magnetizer Albert d'Angers *Difference entre le magnétisme et l'hypnotisme* (1905). The author of this book is presented to the readers as Bissk's teacher. In a short summary, this book totally denounces magnetism as a pseudo-science and at the same time establishes an absolutely definite continuity between demonism, miracles, magnetism, and contemporary forms of "non-traditional" treatment. D'Angers wrote that magnetism could be:

1. Mineral—when the activity of magnets is taken into account.
2. Terrestrial—when the factors govern-

ing the dip and deflection of the magnetic needle are regarded.

3. Animal, or human, when it is desired to speak of the influence which one person can exert upon another, and of the sum total of the phenomena produced by this phenomenon.

Thus, d'Angers separates the activity of magnets from psychotherapy. With honourable wrath he rejects "mineral magnetism" and becomes engrossed in the third variant of "magnetism", which, on the one hand, is contiguous with the well-known hypnotism, and on the other with occult sciences and extreme obscurantism.

Let us take for granted the fact that charlatans themselves turned away from magnets, and discuss material substratum of magnetotherapy.

After many centuries of the empirical use of magnets for the treatment of various diseases, stimulated by statements of such authorities as Galen, Paracelsus, and Avicenna, there came a period characterized by a certain indifference to them, caused to a great extent by the enthusiastic attitude towards magnets on the part of charlatans who did very much to relegate the role of magnetotherapy. For a long time the biological activity of magnetic fields was refuted and their use for medical purposes was considered to be futile.

Now a branch of science known as magnetobiology has been created. The scientists

and physicians who have devoted their research to its development have achieved certain success in the investigations of the nature of biological activity of magnetic fields as well as in their attempts to employ them in medical treatment.

Moreover, as has been noticed by the Soviet physicians Yu. Kholodov and G. Sоловьева, the process related to the development of magnetotherapy does not in any way differ from the further progress of other fields of physiotherapy: its scientific substantiation lags behind practical application. At present it has been firmly established that the character of changes under the impact of magnetic fields in all the organs and systems is absolutely the same as in the case of other biologically active factors of the environment—the electric current, the UHF and SHF fields, and pharmacological influences. The degree to which the changes brought about by the magnetic fields is expressed depends on their parameters, conditions in which they are used, and the sensitivity of organism. It is noteworthy that no linear relationship exists between the biological efficiency and the changes of parameters and time pertinent to the use of the magnetic field.

On the whole, over the past 10-15 years it has been established that the magnetic fields of constant and variable character of diverse intensity can be effective in the treatment of patients, exerting in a given

number of observations (by no means all), anti-inflammatory, anaesthetic and thrombosolvent influence on a large number of diseases.

I.L. Degen, A.K. Pankov, and I. M. Mithbreit, among many other highly qualified researchers, established clear-cut boundaries of the method's possibilities and the optimum forms for its clinical use. There could hardly have been any question of a kind of "miraculous power". Magnetherapy has unostentatiously taken its modest place among copious physiotherapeutic methods, bringing moderate results, when properly used, to a restricted number of patients.

Only ignoramuses, who never read anything seriously and who do not study medical subjects, can still regard magnets as the redemption from all human misfortunes. The magnetic sensation has come to an end, and the method has remained in the doctor's inventory.

A very special place in present day magnetherapy is allotted to the problem of treating malignant tumours. Beginning in 1940, numerous experimental investigations have been conducted which have convincingly revealed that the magnetic fields of diverse intensity can actually produce an anti-tumoral effect.

This research has served as a basis for the beginning of serious clinical studies. Their development was hindered by the

absence of magnetic installations, which would have allowed release of strictly dosed out and controlled procedures. At present, the clinics have apparatus of this kind at their disposal and it has become possible to study and employ the anti-tumoral activity of magnets. In what follows we have a brief account of such research by Dr. R. N. Salatov at the Rostov-on-Don Oncological Institute.

Those who underwent the author's method of treatment with the help of magnets included 189 patients suffering from the carcinomas of the skin and lower lip. These forms of the disease were chosen for two reasons. In the first place, the carcinomas of the skin and lower lip do not present any direct danger to the life of the patients. Secondly, these tumours readily lend themselves to the direct control of the physician and periodically to microscopic tests when necessary. Thus, all the demands of safety for the patients and the objective assessment of the results were complied with accordingly.

A highly elaborate analysis has made it clear that though the factors conditioning the activity of the magnets remained undetermined, mention must be made of the authentic clinical changes in the course of the carcinomas of the skin and lower lip, which were confirmed with the help of the special methods of microscopic examination.

It has also been established that regression of the tumour can be achieved only during the early stages of the lesion (first and second stages). As compared with surgery, laser or cryogenic effect, and radiotherapy, the treatment with the help of magnets is not characterized by any substantial advantages. What is really important is that the influence of the magnetic field upon the development of tumoral process has now been proved scientifically valid. That is all. There is some reason to believe that if we continue working, magnetotherapy may receive some rights in oncological studies. The famous Aureolus Theophrastus Bombastus von Hohenheim who was better known under the pseudonym Paracelsus was wrong, and the no less renowned Mesmer was undoubtedly a charlatan. The mountain has brought forth a mouse. A gross fallacy in science gave rise to yet another run-of-the-mill method in physiotherapy.

## Chapter Four

# Miracle-Working Healers, Charlatans, and Quacks

### The Progress of Science and the Sciolists

The deeper science penetrates into the mysteries of nature, the easier it becomes for the dilettantes to become engrossed in miracles. Such a "sensation" was picturesquely described by Stefan Zweig: "With their aggressive scepticism and irony Voltaire and the encyclopedists, having eradicated from the society of the eighteenth century the ecclesiastic faith, did by no means destroy the unvanquishable human need in faith as such, but only in some of the back streets and cul-de-sacs. Paris had never before been so avid to acquaint itself with the novelties and superstitions as in those early days of the Age of Enlightenment. When the society turned its back to the protagonists of the Bible, it began to quest for new whimsical ideals and discovered them in charlatans Rosenkreizers, alchemists, and filathets, in whose rapid influx it soon found itself submerged. All that was improbable, everything that contradicted the limited knowledge one received at school found an enthusiastic welcome with the philosophically coiffed society suffering from ennui. The passion for uncanny science, white and black magic, permeated everywhere, including the upper

strata. Madame de Pompadour, the ruler of France, in the darkness of night would steal to Madame Bontan through the side door of the Palace of Tulleries to have her fortune told by coffee grounds. Duchess d'Urfé ordered to have the tree of Diana prepared for herself (we can find this in Casanova's writings) and physiologically rejuvenated in the highest manner. An old woman lured Marchioness de l'Opitalle into a God-forsaken inn, promising her that at the time of the black Mass she would behold Lucifer in person; but while the kindhearted Marchioness and another lady were waiting stark naked for the advent of the devil, the unscrupulous old woman disappeared with their clothes and purses. The highly respectable men of France trembled with revered awe when at supper the legendary Count Saint-Germain very subtly and yet with seeming carelessness mentioned that he was one thousand years old and that Jesus Christ and Mohammed had been his personal acquaintances!"

Stefan Zweig was wrong when he thought that passions of this kind were characteristic only of the time he described.

A shocking example of this is the "Philippine boom", when thousands of sick people from Europe and the USA attracted by an unscrupulous fuss rushed to the Philippines in quest of the miraculous cure.

## The Philippine Healers

The press wrote with certainty that, as a result of special training, the bare hands of a physician could open the living tissue without harming the large blood vessels, penetrate into the depth of the organism, as, for instance, in the abdominal cavity, and remove the tumour from the diseased organ without leaving any traces on the body, not even the slightest scar.

Professor of biology, L. Watson, did not have the slightest doubt that the manipulations of those healers were genuine rather than a trick when he rapturously wrote that in the presence of scores of eyewitnesses they performed the miracles of psychosurgery; they had neither instruments nor anaesthesia. Their only instruments were their hands... And that was all. They did not have the slightest idea about asepsis, and yet there was not a single case of either infection or post-operative shock.

What the English professor wrote clearly demonstrates that the faith in miracles does not necessarily imply illiteracy. One can even have an education in biology and be a professor.

Those who are in favour of miracles, as well as their voluntary and involuntary proponents, often avail themselves upon a simple and what seems to be a clear method. They refer to a concrete case

using the phenomenological method of proof.

Several years ago at the House of Scientists in Moscow it was possible to see films about the operations without a scalpel and anaesthesia.

The so-called surgeon, without even rolling up the sleeves of his shirt and taking off his wrist watch, pressed against the patient's stomach with his bended fingers, while the patient was lying on an oilcloth covering an ordinary table. Soon between the fingers of the quack doctor there appeared a bit of liquid which the commentator called blood. To enhance the effect those whose nervous system was not strong enough were asked to shut their eyes. The wound, naturally, could not be seen, but from the explanation, the surgeon had already penetrated into the deeper regions of the abdomen and "was rummaging inside the stomach". Several minutes passed and a small piece of tissue—the removed tumour (!) was in his hand. It was immediately thrown away.

The patient got up from the table as if nothing had happened, with the conviction that he had been cured of cancer. The next one in the queue took his place.

The famous physician and writer Professor Shubin, on seeing the film, shown together with a similar "amateurish" piece of art concerning parapsychology, asked his neighbour what he thought about the

film. The man turned out to be an experimental physicist from a large academic institute.

“Regarding the motion of all those dishes about the table under the influence of psychic energy, and the switching on of electric bulbs as a result of the man’s fixed stare and other tricks of this kind, all this is what they usually do in the films. Now... as to the operation; well, there must be something in it.”

“But they didn’t show us either the operation wound or the internal organs,” said the doctor rather surprised.

“Didn’t you see how the quack’s hands got straight into the patient’s bowels and extracted the tumour?”

Since it was impossible to prove anything to the physicist, there remained nothing else to do but to take revenge.

“And I, as a surgeon,” said Shubin, “do not have the slightest doubt in the authenticity of telekinesis and the transformation of psychic energy into electricity at a distance, but what I do most categorically is say that the operation is a fraud of the first degree!”

The joke was a success.

“You are quite right,” agreed the physicist laughing, “let the specialists have the last word.”

The French journalist A. Ledau, who remained in the Philippines for some time and brought for a morphological analysis,

pieces of tissue seemingly removed from the patients and immediately out of the hands of the quack doctor, wrote:

“The histological analysis and the examination under the microscope of all the remains make it possible to assert that neither the organs nor the tissues belonged to any human being and were not parts of cancerous tumours...”

In another instance the investigation of the ovaries that were assumed to have been removed from oncological patients “without pain” proved to have belonged to goats, and the blood covering them was taken from the animals.

The French TV cameraman Jean Luke Manier, who watched more than hundred of such “operations”, managed to expose the tricks with the help of a camera directed at the hands of those “wizards” and under the operating tables. It is not surprising, therefore, that since then, the Philippine “healers” have been avoiding any illustration of their “skill” in the presence of physicians, journalists and... magicians.

It would not be wholly out of place to mention here that the professional prestidigitators and magicians have not infrequently helped the doctors to expose the charlatans. One of these exposures is the example given below.

### Sheikh—the Magician

In one of the 1984 issues of *Literaturnaya Gazeta* S. Medvedko described a reception in Syria held by a sheikh—healer.

"We found ourselves in a room lit by a single lamp. The floors and walls were covered with carpets. Some thirty people were seated on cushions against the walls. Among them were cripples, sick old men, all of whom were drawn to this place by the hope to obtain relief. We greeted those present and took our seats where there was still vacant space.

A young man wearing a national head-gear that looked like a calotte served cups of strong black coffee a la Bedouin. Then a bowl of fresh water was passed around the circle. Bakhri said that the little copper bowl had been brought from Mecca—hence, everything that was poured into it became 'holy' and curative. There was nothing else to do but to sip the water that was worshipped. A revered stillness prevailed. The only audible sounds were a slight coughing, sighs, and the clicking of rosaries.

After the prayer three men in shirts that were so long they touched the floor took out of a cupboard tambourines of enormous size, and the others started to rhythmically move their shoulders to the beat of the instruments, simultaneously repeating certain words. Then the rhythm accelerated. The people became ecstatic;

the movement of many of them seemed to be unrestrained, while the others, with their eyes shut, moved their heads also rhythmically. Then all of them got up, forming something like a ring. Under the influence of rhythm people were actually becoming frenzied.

Then in the centre of the ring we saw the sheikh. He was a swarthy man of middle height wearing a black garment. He took out of the cupboard two swords and a cane. After putting the swords on the carpet he raised the "cane".... A hardly perceptive movement—and in one of his hands remained the "cane", which thus served as a scabbard, while in the other hand he now held something like a hiltless sword. Waving this weapon several times, he suddenly rushed in my direction. I got quite scared. The sheikh ran up to me, pulled up his gown, exposed his belly, and shouted, "Pierce!" I found the hilt of his sword in my hand.

Feeling quite embarrassed, I mumbled something like "I can't" in Arabic. But the sheikh, putting the hilt of the "sword" into my hand, placed the edge next to his abdomen to the right of the navel and pressed his whole body against the blade. The people were shouting frantically with the sounds of the tambourines deafening the din itself. When the sheikh saw that I was of not much help, he got hold of the blade with his two hands and I could feel that

the hilt (it was still in my hand) went several centimetres further; then the end disappeared inside the man. He pressed my hand to the place where the cold metal was piercing the abdomen. My fingers could actually feel how the blade was going deeper and deeper. There was not a drop of blood! Suddenly the sheikh rushed back with the blade sticking out of his belly. Then he rushed towards me again. He bent abruptly; the hilt was pressed against the floor and he quickly fell upon the blade—the end of the blade appeared from out of his back... One more jump of this kind and the blade touched his abdomen. Then, putting it into my hand, he shouted: "Pull." As I did so, the sheikh rested upon it with his body. The people continued to rage. I took out the blade. Afterwards Abdel Kadir began the treatment: the crooked, the lame and the humble—all rushed to him. The sheikh, as I was told, treated all illnesses. The "volunteers" out of those who were present formed a queue in accordance with how serious their malady was (in their inexperienced view). He reeled off prayers, moved his body from side to side and now and then shouted certain words. He was getting more ecstatic with every minute, and thus received, as his "assistants" told me, the magic "divine" charge, or as was specified in scientific terms by my intellectually looking neighbour, a "charge of cosmic energy". Then the actual treat-

ment started. The first patient was a peasant, who was either a hunchback or a man twisted from radiculitis. His gown was taken off. Abdel Kadir made him lie on the floor, then began massaging the patient. Having rolled up his sleeves "kneaded" the patient's back with his fists, whispering at the same time. Then the young assistant continued the procedure—with his heels... The peasant interspersed his moanings with inaudible incantations. After ten minutes or so the sheikh suddenly cried in a loud voice that gave me a start: "Rise! You are well again! Go home in peace!" The fellah began to fidget noisily, then stood up, straightened his body, stood for a while hardly knowing what had happened, and made several steps towards the door. Then, as if seeing the situation more clearly, he approached the sheikh and furiously thanked him. The next patient was a thin man whose nervous tic convulsed every muscle of his face. Abdel Kadir shut his eyes and put his hand on the head of the sick man. The convulsive jerkings did not cease. With a movement of his hand the sheikh asked another sheikh to come up to him. The other one took the nervous patient behind the curtain. A short time after that what gave me another start was a heart-rending cry. "Don't worry," said Bakhri, "this treatment is called "al-kei". It is cauterization. "Al-kei" lies at the very bottom of Arabic medicine and treats

absolutely any disorder. It is only necessary to know in what part of the body one should cauterize the nerve-ending." To my great surprise, I soon saw the thin man walk out from behind the curtain with a calm expression on his face!"

The narrative continues with even more details. What is most striking is that it was a Soviet journalist, with a higher education, who attributed some miraculous properties to a "treatment" that had been no more than a "variety show". If we were to speak in concrete terms we should be obliged to quote People's Artist of the USSR A. Akopyan who said that the trick with the sword, which produced such an impression upon the author of the above article, was not difficult at all. In that same issue of the newspaper Akopyan writes of things that are even more amazing. For instance:

"What brings our art and religion together has a long history. Both were cultivated as far back as Ancient Egypt. The art of illusion had fooled people for over five thousand years, and had always been looked upon as one of the greatest mysteries, accessible only to a particular castes of high priests.

The secrets of this art have been preserved in the subsequent periods of time, irrespective of how quests, discoveries and finds have changed. Therefore, it is not surprising that a layman finds it beyond his rea-

son to get to the bottom of a certain trick...

And the tricks, one must admit, were at times remarkable indeed. Self-impaling is child's play. For instance, a certain Belgian scholar of optics who lived in the eighteenth century demonstrated an illusory performance with the 'appearance of ghosts', which held Paris spellbound. The great French magician during the first half of the nineteenth century J. E. Rober-Uden used to fill a barrel with earth, plant the seed of an orange and water it. After a short period of time those present had the chance to witness the emergence of a green sprout, and then the bush with blossoms and the fruits that were distributed among the spectators. There was also a case when the same magician would be shot by a unit of soldiers, 'catch' the bullets and put them on a plate, remaining intact himself. The American Houdini used to free himself from chains no matter how he was fettered.

In 1865 the magician A. Epstein was the first to show an item called the "simulated execution". The executioner beheaded a woman, and as her body fell down, the blood streaming forth, he would take her head by the hair and place it on a little table, closing the still twitching lids of the 'deceased' with his fingers before leaving himself. Well, the woman was certainly brought back to life later...

However, there has always been a temptation to present such tricks as something that was from the outer world and of divine origin. Medvedko's story is the case in point."

As far as those medical examples are concerned, what the sheikh did consisted in applying the massage together with suggestion—something that has been used for thousands of years without arousing any surprise at all.

### **Healers, Cancer and the Woman-Shaman from Chukotka**

Now, in order to return to the article by Professor Watson about the "operation without a scalpel", it is necessary to make some additional commentary. It would seem strange if hoaxes caused inflammation of the abdominal cavity or shock in patients. But we can be absolutely sure that the developing malignant tumour, seemingly gotten rid of, will do its work: the curable stage of the disease will irretrievably progress and become neglected and incurable. It may well be mentioned that news items as the following continue to appear ever more often in the foreign press: "A child of four has recently died of cancer in the Belgian town of Rocheforte. It was known that his parents, who did not trust medical advice, found it with the Manila 'healer' Tony Agpaoa, who took it upon himself to

treat the young patient. For a period of several months the child played the role of a 'live miracle', and planes flying to the Philippines were crowded with sick people who wanted to be cured by Agpaoa" (*Spectacle du Monde*, Paris).

As far as "psychosurgery"—a term employed by Watson—is concerned, I must admit that I am not familiar with it. Even in fairy tales the surgeon always uses a scalpel.

What surgical intervention presupposes is a physical effect upon the tissues and organs with the help of a scalpel, high temperature (electrosurgery), freezing (cryosurgery), or a laser beam. But how psychic energy can destroy or separate tissues is unfathomable. This also includes the honourable English professor who, as he says, is tired of living in this rational world, and is trying to find ways to bring together the natural and unnatural.

It is very interesting that the "Philippine healers" are not alone in this world. Tricks of the same kind were observed and exposed as far back as half a century ago. What I have in mind here is the data of the Soviet ethnographer and writer V. G. Bogoraz, published in 1931 in a little known collection of papers under the title of *Religious Beliefs of the Peoples in the USSR*. When Bogoraz was in Chukotka in the 1920s, he saw a trick performed in the style of the manipulations of healers in the Philippines. In spite of the subtle art of the woman-

shaman, the scientist managed to unravel her secret.

The woman, Upunge, in the presence of the spectators, including Bogoraz, subjected her twelve-year-old son to a magic operation. "For this purpose," Bogoraz wrote,\* "she made him lie on his back, pulled up his shirt, bent low over the boy's abdomen, took a knife, and passing the blade between her fingers, a customary shaman method, made a long vertical cut and plunged her thick fingertips immediately into it. The boy moaned a little, the blood rushed in all directions, and streamed down to the floor. Upunge bent her body even lower and started licking the wound. In one minute's time there wasn't a single trace on the boy's abdomen, except blood stains and the usual dirt..."

During the experiment Upunge made signs to her two young daughters that she was feeling very hot. From a tub filled with water they would bring her lumps of snow which she would swallow, as is the custom with the natives in those parts of the country. Each lump contained the fresh blood of a seal since it was during the height of seal hunting. Upunge melted the snow in her mouth and then, bending low towards the "wound" would pour the blood on the boy's abdomen. The appearance of a wound was produced by the artful pressure

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\* Quotation by V. Kiryak.

of the shaman's thumbs. The melted blood collected in the folds of the abdomen and thus created an illusion... The Chukchi believe in this kind of surgery most adamantly, as if it were scientific truth..."

Kiryak writes that in reading this information, we are not surprised that the ethnic population in the Far North, which was separated from the centres of civilization due to certain well-known historical and social factors, could not always distinguish facts from illusion. What amazes us is something quite different: how could it happen so that exactly the same kind of firm belief ("as if it were scientific truth") in magic surgery holds sway with our contemporaries?

### **"Folk Medicine" and the Treatment of Cancer**

A very strange regularity is taking place in the twentieth century. On the one hand, we witness unprecedented achievements in medical science that have practically shaken the world. For instance, the victory over plague, cholera, malaria, and tuberculosis, which took tens and hundreds of millions of lives. Those were the "quiet victories" in the sense that they weren't accompanied by any public sensation, although it was precisely they that are of paramount significance to mankind. After them were the "loud victories". Blood transfusion, and

kidney and heart transplants proved to be a sensation of world importance. We could also mention the discovery of antibiotics and sulphanilamides, artificial circulation, and operations on the lungs as well as the esophagus. However, to merely innumerate all the successes in medicine in our century would require nothing less than a whole volume.

On the other hand, journalists, engineers, chemists, philosophers and sometimes physicians persuade us to believe that it is necessary to return to folk medicine, and make use of the alleged enormous experience of the non-professional physicians. One prominent professor published an article in the magazine *Ogonyok* (1982) that it was essential to build a special institute. He even went so far as to avail himself on the pages of a social and political magazine quite remote from medical studies and to outline the whole program for the proposed institute.

"But, of course, an institute of folk medicine could not deal with just the study of methods suggested by the non-professional (amateur) physicians. Its aims are undoubtedly ever wider. I see its main role in that the whole inventory of folk remedies should be provided with a modern scientific foundation and their propagation should be scientifically valid and purposeful with social and economic regularities taken into account. To achieve this aim it is necessary

to first and foremost collect, systematize, and study all folk remedies. Hard work, of course.

I have devised the tentative structure for the future institute. One of its sections should be for non-traditional methods of diagnosis. Isn't it a fact that in the olden times amateur physicians could easily tell one disease from another by the iris of the eye, the tongue, the floor of the auricle, the skin and the pulse. Unfortunately, our doctors only have a vague idea of this kind of diagnosis."

I am sure that this statement is no more than a tribute to what is in vogue today. Any doctor is aware of highly important function of the laboratory, instruments, and has general experience in the art of diagnosis. Many "features" of disease have been lost not because today's doctors are lagging behind their ancestors, but merely for the reason that more authentic and reliable means of diagnosis are available.

The vast majority of people in civilized countries trust their doctors implicitly. Quacks and charlatans are approached for advice and treatment in the following three instances.

1. Despair. When there is no hope, and a person "holds the last straw". This happens when it is absolutely impossible for the doctor to help or when the given physician is powerless and does not know where to direct the patient (an impermissible yet by

far not infrequent variant), and when the patient thinks that no conventional remedies can cure him. The latter is particularly common with those who have malignant tumours, since the pathology of the psychic state is one of the expressions pertinent to the disease.

2. According to the pithy expression of doctor L. Sklyarevsky, a man gets interested in herbs "in case they come in handy", out of sheer curiosity, or for economic purposes. Various herbs can be collected, dried, used for disorders, and recommended to relatives and friends. Like the passing of recipes among women.

3. When the social, geographic, political or economic factors are such that it becomes impossible to make use of medical help on the contemporary level.

And it is the last case, or the last circumstance, that should be regarded most seriously. If the first two reasons are connected with interest in folk medicine, so to speak, in individual character, the last of the three is something in which communities numbering millions of people are interested. It is precisely for this reason that the World Health Organization has paid so much attention to folk medicine, and not because, as some people think, we do not have an institute of folk medicine and it must be organized as soon as possible. But only because there are millions of people in the world, particularly in Africa and

Southeast Asia, who are deprived of normal medical help and cannot possibly do without the folk physicians.

Many authors doing research on the history of medical studies, folk medicine and quackery particularly stress that quackery should not be confused with folk medicine. "It proves to be highly beneficial since in most cases the elements include valuable medicinal substances and effective methods of treatment" (M. Shilov, 1958).

At first glance this point of view seems to coincide with the well-known position of the World Health Organization experts who recommend the integration of folk and conventional medicine. However, it is necessary to get to the bottom of it all.

For all of history there has always existed together just two forms of rendering medical assistance to people: medical aid and quackery (charlatans). No third kind of medicine, or folk medicine, has ever been distinguished by the historians of medical science and which cannot be but justified. All that was observed to be valuable concerning the treatment of people has been assimilated by doctors and analyzed and described, much of which has remained in the inventory of professional medical treatment. It is where the culture is poor that quacks and charlatans avail themselves upon an open field of activity. In what follows we have a brief outline of how charlatanism developed over the ages.

Medicine and charlatanism came into this world at one and the same time. Indeed, quackery and charlatanism are as old as medicine, since it is a well-known fact that as early as the ancient times those who treated sick people on the basis of an assiduous study of medical science worked in the same society with impostors who claimed to be proficient with no special training.

In the Sanskrit history of medicine pertaining to the Brahman period, the unrecognized physicians who practiced their "art" in old India were regarded as "unscrupulous quacks who, in the guise of doctors, ingratiated themselves with the kings (rulers) and were a real scourge."

In the works of Cicero we can find the lines depicting charlatans as those who abused and poisoned the credulous people of Rome. The Roman writer of fables Phaedrus, a freed slave in the days of Emperor Augustus, wrote of a man who gave up his sartorial occupation to become a doctor, and how that man was exposed as a humbug. In his fable Phaedrus made fun of those silly people who trusted the ignoramus with their health and life.

In the Middle Ages quackery flourished mainly in France and Germany.

In France charlatanism found its particularly clear expression at the end of the sixteenth century, when the country was flooded with the so-called charlatans—a spe-

cial type of people who were dressed in brightly coloured clothes of comic characters, travelling on foot or in garish wagons from one town to another and from place to place with a stock of various miracle drops, powders, elixirs and others. They would make their arrivals known by bugling or playing the violin and guitar, thus collecting a throng of inquisitive and sick people.

In 1793 when the medical departments in France were closed, and the right to treat patients was given to practically any one, charlatanism reached the acme of its development. The number of charlatans had become so great and so obvious was the harm they did that in 1811 the French government was compelled to restrict their activity by issuing a decree on the right to practice treatment. It was a severe blow to all the unacknowledged practitioners who, although down, proved to be not altogether out in the later years.

In the sixteenth and seventeenth centuries in Germany, just as in France, the nomadic charlatans also enjoyed no small success. There were other impostors also practising the same kind of art. Among them were people of quite different walks of life, e.g. clergymen, chemists, midwives, shepherds, blacksmiths, hustlers, barbers, snake-charmers, distillers, bath-house attendants, alchemists, magicians, confectioners, shop-keepers and executioners.

Charlatanism of the eighteenth century, if we do not take into account the magnetizers, spiritualists, occultists, and the rest who practised the art of healing, did not differ very much from charlatanism of the preceding centuries in its methods. Only in the second half of nineteenth century did the abuse of ignorant patients began to manifest itself in new forms (as a matter of fact, pseudo-scientific). Especially fashionable was the "treatment by means of nature itself". Isn't it similar to what is happening at the end of the twentieth century?

The itinerant charlatan dressed in livery is seen no more. He has been replaced by a settled practitioner dressed in an ordinary costume. The bugle has been silenced, although the public sensation has began to function louder and more assuredly in all forms of mass media; drops and elixirs for syphilis and gonorrhea are no longer eulogized by the charlatan from his wagons, but what we have instead are advertisements of similar remedies on the pages of our newspapers.

The famous historian of medicine L.B. Bertenson wrote in 1911: "The only feature which is shared by the present period with ancient times and the Middle Ages is the support that is rendered to quack-doctors and charlatans by high-ranking officials. Today the self-styled practitioners and their remedies enjoy the same

kind of sponsorship on the part of the powers that be as they did in the early period of human history!" However, this sad phenomenon cannot possibly find its explanation only in the well-known aphorism, which says that "there where the physicians err, the charlatans are trusted!"

It is particularly dangerous when the pseudofolk quacks take on the mission to treat the cancer patients. At the end of the 1950s M. Shishlov published the following story, related to him by the mother of a sick young woman:

"One day my daughter discovered that she had a little lump the size of a pea on her right breast. She should have seen the doctor if it had not been for the neighbour who advised her to go to a place in the Vladimir region, 20 kilometres away from us. In a house, where a woman practising quackery lived, she was immediately taken into a dark room.

"And now, what is your little problem?" asked the quack.

"You see, I have a swelling on the breast," said the daughter. "I am afraid it might be some dangerous disease."

"How long have you been having it?"

"Well, recently my little boy quite accidentally hit me with his hand, and I felt the pain. I didn't think much about it, knowing it would soon stop. The pain did cease to trouble me, but the general indisposition has worried me a lot."

"It's all right, my young woman," the quack soothed her.

"You'll soon get well again. Now, just sit on that chair, my dear."

The old woman poured some water into an enamel bowl, dropped a small cross in it and made Marusya look into the water, while she herself began whispering incoherent words. After the "treatment" was over, the old woman poured the same water into the bottle and told Marusya to take a teaspoonful of it twice a day, and come to see her again in six months. However, the young woman was not happy for long. The tumour continued to grow, the old woman's water did not help, and she had to go to a doctor, whom she did not tell that she had undergone the quack treatment. She was ashamed to admit it. The doctor, on examining the patient, had no other alternative but an immediate operation.

Marusya took it very hard. But her mother had found out everything about the quack doctor and persuaded the young woman to have an operation. No words could describe how she cursed that old woman! However all this is in the past. Marusya feels quite well and is wholeheartedly grateful to the doctors."

In a place called Taininka in the Moscow region there lived a quack doctor Malushkin. He undertook the "treatment" of absolutely all diseases, and primarily those connected with malignant tumours. The

USSR Public Health Ministry decided to test Malushkin's "medical" activity. At a clinic of one of the Moscow medical institutes he was allotted a special room and reception hours for outpatients.

Over 150 people, whose state of health was thoroughly checked by the specialists beforehand, received treatment under Malushkin. All of them were selected for the course of treatment with his consent, and many of them were old patients of this quack doctor.

A time-consuming and elaborate observation by experts of the result of the quack doctor's activity proved that Malushkin was totally illiterate, uncultured, and had extremely primitive ideas regarding the anatomy of the human body, essential features of diseases, and the effect of remedies. Not one of his patients suffering from the illnesses mentioned above recovered.

The patients with malignant tumours (out of those who refused the specialists' offer for surgery) were not cured, while several people died as a result of a marked deterioration in their state of health.

A considerable number of Malushkin's patients were registered in oncological establishments. Many of them lost precious time; it was too late for surgery.

Malushkin himself, however, insisted that his wife be treated "without any secret remedies" when it was discovered that she

had cancer, and it was necessary to send her to a clinic.

Thus the "famous quack doctor" was exposed.

This all took place thirty years ago. But the following was published by journalist Yu. Vigor in November 1983. The author begins his article by discussing three documents.

The first is a letter to the editor signed by a large number of former patients:

"We arrived at the village Novaya Obre-zha from different parts of the country, each with his or her own misfortune, with his or her own disease, hoping to get rid of it with the help of Nadezhda Guchik—the bonesetter. But as soon as we came to the town of Beltsy, we were surprised to see taxis and privately owned cars waiting for the patients. The fare to Novaya Obre-zha (30 kilometres) was as high as 25 rubles, and bargaining was out of the question.

It is practically impossible to see Nadezhda Guchik. Honest queueing is but wishful thinking, and it is only by means of a large sum of money that one can succeed. We ask you to send an official representative to see for himself such an outrage."

The second document is an advertisement distributed by unidentified people to passengers on the trains running to Beltsy:

"Her sweet fingers are really wonderful

and penetrating, worthy of thousands and thousands of kisses... And so this ordinary Russian woman dressed in rural clothes came into the room. Her hands also seemed to be quite ordinary. At first she approached the children suffering from astigmatism. Taking off their glasses, she said that there would be no more need in them. In several minutes both the children and their parents are free. The parents are relieved of the anxiety for their children, and the children do not have to suffer any longer from their disorder. Wish you all the best, dear folks, are Nadezhda Guchik's parting words."

The third document is a recipe that was presented by the quack to all her patients. It was printed at the Falesht Printing Shop (Order No. 125, 3,000 copies). Mix 0.5 litre of vinegar and one litre of water. Then heat the contents of a packet of sea salt and a packet of river sand and put the mixture into a little feedbag. Put a small piece of cloth soaked in vinegar water on the aching place with the little feedbag with sand on top of it."

The person is Nadezhda Guchik—a peasant woman whose education is no further than elementary school and who has never had any medical training. Yu. Vigor writes that there is nothing exceptional about her. For the greater part of her life she had worked in the fields of the collective farm and on her own piece of land until, already ad-

vanced in years, she suddenly felt she was endowed with some kind of "divine power", as she herself puts it.

What we are most inclined to believe is that someone had taught her elementary massage for correcting displaced vertebral discs. This gave her the possibility to start "her own business". Everything else, including the legend about the "divine power" and the myth of "wonderful sweet fingers", is no more than the necessary accompaniment to the loathsome show that takes place at her doorstep every day.

There are many people who believe in miracles and go to Novaya Obrezha with injuries to the central and peripheral nervous systems, with complicated orthopaedic illnesses such as torticollis and congenital dislocations of the femur and the kneecap. And lastly, with eye diseases, psychic disorders, epilepsy and others.

What then does Nadezhda Guchik offer them?

"Correction" of the disc, circular movements of the head in this or that direction, as well as one and the same kind of compress, which is not recommended to most of the patients.

Sometimes, however, it does help. Some of the patients who suffer from the relatively mild complaint, of the so-called prolapse of the disc or "slipped disk", in some cases experience short relief. And this is quite sufficient to sustain the alluring

legend about the healer from Novaya Obrezha.

Upon acquainting themselves with Guchik's activity the authoritative commissions came to the conclusion that she is completely illiterate in medical science and does not have the slightest idea about the diseases she undertook to cure, in some cases bringing about great harm to her patients. In particular, time is lost for conservative treatment and surgery, and the state of a number of diseases is aggravated. The methods employed by Guchik often lead to grave and irreparable complications. The commission was unanimous in declaring that Guchik should be prohibited in carrying on her illicit practice.

The author of the article can be wholly justified in raising a number of questions: How could it all have become possible? Why do the local authorities, instead of decidedly forbidding the unlawful activity of quacks, are lenient and permit them to make fabulous profits by cheating people. They are even provided a police unit to see to that they can "function" in peace. According to information received from the district financial department Guchik received an annual remuneration for her services to patients of over half a million roubles.

The law, which prohibits anyone to practise medical treatment without special professional education, is most flagrantly violated. It is clear that we cannot endure

all this. We cannot possibly remain acquiescent when fraud reigns in broad daylight and when belligerent ignorance flourishes in the vanquished hopes of the deceived.

### **A Belligerent Ignoramus**

Neither social progress, achievements in science, nor the improvement of the living standard can stop the activity of obscurantists and quacks. Moreover, they continue directly attack physicians with pseudo-folk medicine precepts as their main weapon. The following took place in Sochi not so long ago.

Chernyshev, an old pensioner who had worked as a builder all his life, had for almost a quarter of a century received patients at his home for treatment of absolutely all the diseases, including cancer. What served as the remedy for all disorders was the self-made "elixir", which, according to what he said, consisted of the products of bee keeping.

The local authorities tried to bring an action against Chernyshev for his illegitimate "medical" activities. However, the court's decision was different: "...the Court takes into consideration the fact that Chernyshev is a person advanced in years and committed a violation of the law that did not lead to any grave consequences. Quite the contrary, the tablets and liquid that

he had produced exercised a curative effect upon the sick. Hence, the Court finds it possible to terminate the given criminal case and subject Chernyshev to administrative punishment..."

This very lenient sentence was undoubtedly influenced by the intrusion of one popular magazine. In December 1979, when the investigation of Chernyshev's case was in progress, the editorial board of the magazine held a "round table conference" in Moscow in the presence of Chernyshev himself.

In the course of the hearing it was learned that Chernyshev was by far not so non-mercenary, while national popularity inspired by the magazine enhanced the stream of those anxiously willing to be cured with the help of his "elixir".

Chernyshev tried to substantiate his method of treatment "theoretically" in hand-written articles and treatises. In these compositions he made every possible effort to defame "scientific medicine", contrasting it to folk medicine, to which he applied such a highly sophisticated term as demopathy. Below is yet another example of how the term "folk medicine" camouflages sheer charlatanism.

"Isn't it a fact that by amputating or irradiating a certain part of the human organism, the mechanopaths (the ordinary doctors—*Yu.G.*) actually increase the number of invalids? But we do not bring any

action against them. We even go so far as to admire their art. What art? The art of producing incapacitated people? On the other hand the demopaths, who cure the very same patients without turning them into invalids, are made to appear before the court!"

In the person of Chernyshev the demopaths are propagating "simple, universal, and painless" methods of treatment:

"Chernyshev's elixir is a remedy that eliminates any disease; it is the agent that evacuates the wastes from the organism irrespective of the difference in their properties and qualities or relationship to their location, whether they are found in the cells of the muscles, the cells of the tissues, or the cells of the haematopoietic or circulatory system.

It simply drives out the wastes from the organism, makes it 'pure', or in other words, healthy. It is particularly important that there are no contraindications, which serves to prove that it is an absolutely new approach to the human organism, a new trend in therapy and a new landmark in the history of medicine, making it abundantly clear how it is possible to get rid of the diseases by means of driving them out rather than by destroying them. This method of treatment does not imply any incapacitation at all. It (the method) directly and unambiguously reveals that it is **high time the existing page in history of medicine**

were turned over (emphasis—Yu.G.) and that it should begin with a virgin page and a new chapter."

It all sounds very simple, doesn't it?

Chernyshev's suggestions were discussed by the USSR Academy of Medical Sciences, the Central Board dealing with the inculcation of new medicinal agents and medical technology of the USSR Ministry of Health and the Pharmacological Committee. They were unanimous in a negative assessment of Chernyshev's invention and warned him of the inadmissibility of cheating the patients.

The uncompromising position of high-ranking administrative bodies in this matter in no way expresses the underestimation of the experience of folk medicine.

My friend and coauthor Professor Shubin, who is no longer with us, studied the case histories of people living in Sochi who in their lifetime refused to be treated in the city's oncological dispensary and joined the ranks of quack doctor's patients. He had the lamentable experience of seeing for himself how detrimental Chernyshev's activity was for the patients. They all died within a rather short period of time. In the hematologic section of the dispensary there was a young man who suffered from lymphogranulomatosis—a tumoral disease of the lymphatic system, which now readily lends itself to drug and radiotherapy. The diagnosis was put at the Leningrad Roentgeno-radio-

logical Institute. There they managed to start a course of effective chemotherapy and give the patient half of the radiotherapy dose.

Everything would have been successful had it not been for the parents of the young man who, after reading a notice in a popular magazine, took their son to Sochi, where for four months he took Chernyshev's "elixir". In a very serious state of health and with an obviously progressive illness the patient was hospitalized in the oncological dispensary.

During the talk Shubin had with Chernyshev in the presence of two highly qualified Sochi doctors, Chernyshev admitted that not all of his oncological patients survived when his method of treatment was applied. Then he was asked to name at least one who had been cured of cancer. Chernyshev gave the names of several of them. However, those he mentioned who permanently lived in Sochi had never been examined by specialists and the diagnosis of a malignant tumour had never been established with any degree of certainty.

Later Chernyshev's fraudulent activity was exposed and he was imprisoned. Today it had been made quite clear that the "elixir" consisted of alcohol, water, quicklime, and salt coloured with green tea or motherwort. In accordance with the chemico-pharmacological test "the given liq-

uid could not be used as a medical remedy for the treatment of any disease".

Self-proclaimed practitioners who offer new methods of treating cancer dispute the conclusions made by the highly proficient commissions. They cite pseudo-scientific statistical data, whereas an authentic analysis shows that a considerable number of their "patients" had diagnoses that had never been confirmed by the morphological method—the only reliable proof for the presence of cancer.

The author of this book spent many years of his life studying the errors of the doctors, particularly oncologists. A special group includes the so-called mistakes of hyperdiagnostics, when in some medical establishments the diagnosis of cancer was put without factors serving to reliably substantiate it. Only subsequent observations of the patients and a thorough examination help the doctor to detect the true nature of the disease and reject the merciless diagnosis.

### **Herbal Remedies**

The demand that we should return to "folk medicine" primarily refers to phytotherapy, or use of herbal remedies. Let's examine one of the August 1986 issues of the *Nedelya* newspaper, carrying the front-page article entitled "How the herbs can heal": "Humankind has never been averse to passions. In the middle of the century

we were engrossed in antibiotics and various chemically medicinal preparations forgetting that we are literally surrounded by remarkable plants that can save us from many maladies. According to statistical data the flora in the USSR comprises approximately 21,000 plants, while only 6,000 at best have been studied and only 200 employed in practice. And how many of them are regularly destroyed under the wheels of cars, in the buckets of bulldozers, in our useless shot-lived bouquets, and under the concrete building foundations... They perish unhonoured and unsung instead of falling into the dexterous hands of the drug-gists..." The impression is huge. What we have here is a catastrophe. However, from the highly authoritative scientists we learn that the scientific study of pharmacopical herbs has a history of about 200 years, while for practical purposes herbs have been used for thousands of years. Professor A.M. Rabinovich said: "It goes without saying that over such a long period of time some of the knowledge has been lost, and some of the plants have also disappeared." Professor S.Ya. Sokolov continued: "What we have to do is to look for new herbs, especially since the reserves of the ones we know are being exhausted. But it's more difficult every year that we are able to discover something really remarkable." Where then is the catastrophe? What taking place is planned research and enormous selective work.

Doctor of Medical Sciences I.I. Brekhman, from the Institute of Marine Biology of the Far-East Scientific Centre of the USSR Academy of Sciences, worked on computer prescriptions that were made up of a huge quantity of plants and a still greater number of their combinations as a result of the analysis that was carried out. What was selected included the so-called curative nuclei, i.e. limited groups of plants responsible for the pharmacological effect in certain diseases call for a more elaborate study.

The very same researcher set up two substantial scientific and practical goals in the field of the inculcation of medicinal substances of natural origin:

1. to provide the required volume of the production of preparations that have already been issued, and their high quality;
2. to create new preparations extracted from plant and animal organisms.

It is not difficult to see that this is a usual program to developing that branch of science in which the scientist is seriously concerned. It should be stressed again that instead of encouraging a public sensation and undesired advertising what can be provided by nature should be rationally and usefully developed.

However, it is not infrequent that the recommendations of "folk medicine", particularly concerning serious diseases, result in a tragedy for the simple reason that they

distract the patient from the required treatment.

The flourishing of pseudo-folk healers, or charlatans, to be more exact, is largely indebted to the mass media, which often publish information, such as the following:

“The preparation made from medicinal herbs, a result of three years of research on animals at the University in Omsk and the Japanese Institute of Oriental Medicine, is an effective anti-cancerous agent. It consists of 30 various preparations of medicinal herbs, including the grassy peony which were borrowed from ancient Chinese medicine, and has relatively few side effects.

The use of this preparation showed positive results in the treatment of the breast cancer, cancer of the stomach, rectum, and uterus.

The new preparation does not destroy the healthy cells and, presumably, has a positive effect upon the general physical state of the patients.”

This item might have presented considerable interest if at the end of it there had not been the following phrase: “But, since its anti-cancerous properties have not yet been studied, it will take several years before this preparation could be comprehensively circulated in medicine.”

The question may well be asked: Why doesn't the honourable author of the above item wait for the time indicated in the

article and then start the publicity? Very often articles of this kind encourage people with ungrounded hopes. Perhaps there is someone now who is sparing no effort trying to find the grassy peony and the other twenty-nine medicinal plants. The preceding years made it quite obvious that there is nothing but frustration awaiting him.

Legends of this kind are unusually viable. Professor Shubin once presented a very good example. The legend's inception began with a letter from Anton Chekhov to the publisher A.S. Suvorin. The letter, sent from Melikhovo on January 11, 1897, read: "A remedy for cancer has been discovered. It is already almost a year since the Russian doctor Denisenko has had luck in trying celandine and nipplewort, and now we can read about the remarkable results..."

Chekhov was a discreet physician and did not readily assess any method that had not been tested by him. He merely made a note of it.

Without dwelling at any great length on the details of what lay behind all this we can only say that it did not take much time for Doctor Denisenko's "panacea" be rejected at a special session of the Society of Russian Physicians in St. Petersburg, where many prominent clinicians spoke of the results of their observations. Besides, the famous Russian surgeon N.V. Sklifosovsky made it more than clear that the use of celandine

was no more than "repeating what one had learned before". He pointed out that in medical studies one often discovered what had already long been forgotten.

The perspicacious professor was right: in the years that followed the given herb appeared now and again on the pages of various periodicals. Moreover, after 80 years the problem of whether celandine should be used in the treatment of the polyposis of large intestine was brought up. On one occasion Professor V.D. Fedorov, who was presiding at a regular conference of the scientific society of oncologists of Moscow and the Moscow region, found it necessary to express his opinion on the subject in quite definite terms:

"It is not often that we have been compelled to operate on patients after ineffective therapy using celandine. We have to admit that this method has not been theoretically substantiated..."

Among various quacks who make money on other people's misfortune and thus practice their "art" surreptitiously, we come across those burning with the desire to rid humankind of horrible diseases and have no intention of deriving any material gains from it.

Oncological institutes regularly receive letters from people who offer to try diverse home-made remedies for the treatment of malignant tumours. Sometimes these remedies are alleged to be of folk origin.

In most cases the suggestions turn out to be so primitive that they call for no special test and, as a rule, the authors don't insist on it. In these cases when the recommendations contain a seed of rationality, experiments on animals are conducted.

Any innovation in medicine should be thoroughly verified and analyzed before it can be applied at the clinic.

The test of a new medicinal preparation for the treatment of a cancer patient is an extremely responsible act; according to the laws existing in the USSR, each case is made official by a special order of the Ministry of Health and can be recommended only after a detailed study.

The investigation covers several stages: what is gradually determined is the maximally permissible dose of the preparation, its anti-tumoral activity, the spectrum of its effect and the rational scheme of its use.

In the first stage patients are selected to whom the experiment cannot be hazardous under any circumstances.

All the minute details have been previously considered. Thus, since it is unknown if the new preparation has any side effect, one should begin with small doses. To decrease the risk of simultaneous complications with several patients, each of them enter the scope of observation at a particular interval. The dose is steadily increased only after the doctors ascertain that the

initial or preceding doses have not caused any harm.

If, as a result of the primary tests, the preparation seems to be promising, it undergoes further tests with new groups of patients with the less neglected stages of cancer. However, if favourable reaction is not achieved, the patients are immediately given the approved chemotherapy.

Nevertheless there are still cases, when there is a great deal of clamor made about various spurious suggestions, while the authors of these, if I may say so, methods of treatment, sometimes supported by the press, try to evade the law. There is nothing more dangerous for all of us than active ignorance!

### Oriental Methods

Over the past few years the interest in the pharmacopoeia of the East, with its abundance of exotic recipes extracted from the ancient treatises, has become particularly keen. It is now being considered that present day research of the experience that goes back thousands of years ago can widen the inventory of methods we now employ.

Professor L. Khundanova considers that the original theoretical prerequisites of Tibetan medicines are not deficient in their logic. She writes that the Tibetan physicians can be justified in regarding "health" and "disease" not as entities that are different by their nature, but as two aspects of

a dialectically integral process. The Tibetans thought illnesses are caused by a disturbance in the balance of the vital "sources", and that disease is the suffering of the whole organism, not of any individual organ. Hence, it is the whole organism that should be treated.

Among the "external" causes of the disease, the author says, Tibetan medicine used to single out nutrition. According to physicians, food in the human organism gives rise to the development of "nutritive juice". The seven subsequent stages in the development of which (including the state of blood) calls for a period of seven days, and it is the task of the Tibetan doctor to reduce that period as much as possible in case of illness. Some of the remedies, as is said in the treatise, can restore the sick organism within twenty-four hours.

I hope the readers will not misinterpret my intentions. Professor Khundanova and her 50 colleagues, who have devoted their lives to the interpretation of 20,000 volumes of ancient manuscripts, are making a highly important contribution to the history of science. There is no limit to human research and thirst for knowledge. As far as those "revelations" she writes about are concerned, they are but ABC axioms to any physician if we speak of the relationship between health and illness and the dialectical approach to this problem. The same could be said of the doctor's usual

statement that in the course of any illness the whole body suffers rather than one particular organ. Any person who at least once in his life had a boil knows that what seems to be a purely local process is invariably accompanied by a general reaction (rise in temperature, overall indisposition, etc.). Everything else (the "nutritive juice" and the remedies that relieve the person of his illness within one day) is very far from the actual state of things.

S.A. Vardanyan, Candidate of Medical Sciences, also devoted many years of her life to the study of parchments and the ancient publications on medicine at the Matenadarane Research Institute of Ancient Manuscripts in Yerevan. The number of works of this kind at the Matenadarane exceeds one thousand. The oldest of them is the book on the treatment of diseases by Gagikh Khetum, an Armenian scholar in the tenth-eleventh centuries.

The Armenian scientist had been concerned with exactly the same research of Professor Khundanova and her collaborators, the only difference that the latter does her work in a different republic and studies the history of medical science of another people. Vardanyan speaks about possibly using the ancient recipes, with utmost caution. "A line of an old manuscript can have its place amidst the efficient methods employed in treatment today. But, I repeat, only after very thorough verification. Any 'un-

controlled activity' here is very dangerous; suffice it to say that the ancients were perfectly well aware of the sense of balance and divided components to a precision of the hundredths of a gramme."

Let's return to Tibetan medicine.

The study of books on Tibetan medicine has revealed that an attempt was made in them to give an outline of theoretical concepts and even the origin and development of diseases.

Soviet scientist E.G. Bazaron, who was enraptured with these scientific truths, writes: "In the past the basic difficulties concerned the language barrier and the absence of a tenable methodological approach." What, in fact, did the researcher discover after employing a tenable methodological approach and after overcoming the language barrier? It seemed that what lay behind the barrier were concepts pertaining to the origin and development of diseases on the level of the first century A.D. The causes and pathogenesis of the diseases were associated with the systems of "rgung", "mikhris", and "bad-khar", which, according to Bazaron, means "gases", "bile", and "mucus". Hippocrates explained the emergence of serious disorders, including cancer, by the distortion of the proportions of the main liquids of the body—blood, mucus, yellow and black bile. Several centuries later, the Greek physician, Galen, plainly asserted that ill-tempered women are pre-

disposed to tumoral diseases. In the opinion of Avicenna such a widespread form of cancer as scirrhous can develop from an inflammation—a phlegmon, erysipelas, or a boil. But all this was said hundreds and thousands of years ago! Why then should we feel so excited over the “finds” in books kept at the monasteries which contain the very same primitive knowledge? It should be mentioned here that all this occurred prior to the study of anatomy and before blood circulation was discovered.

It is worth recalling the words of authoritative French expert, President of the International Congress of Pharmacologists, Paul Lesh, who said: “...folk remedies can be used only until they do not hinder the active treatment of the patient. If, in the case of cancer, the patient hopes to improve his state of health with the help of tinctures, and refuses effective although dangerous medicines, he is committing a crime against himself. The same knowledge should be shared by those suffering from any serious illness. Nobody should be misled by any fanciful ideas: in cases like these the treatment with the help of those ‘dear herbs’ can have no other outcome but a lethal one...”

A large number of medicinal plants (Lily of the Valley, foxglove (Digitalis), Valerian, Cudweed, etc.), which are now widely used in therapy, have been borrowed from folk medicine, but are cleaned off the husks

of quackery. And the exaggerated role of folk medicine before the Great October Socialist Revolution was conditioned by the monstrous lack of physicians and remedies in, at that time, a backward country.

This is what M. Nosal, who devoted 45 years of his life to the collection and study of medicinal plants, has to say on this subject: "When a village was situated 30-40 kilometres from a town where there is a doctor and the rural doctor's assistant was 15-20 kilometres away, and a person was seriously ill during the autumn or spring slush, it was impossible to travel. There was nothing else to rely on but the available medicinal plants, as I was fortunately familiar with them and lived nearby."

The USSR Institute of Medicinal and Aromatic Plants was organized a long time ago and is still productively in operation. It is necessary to clean the "gifts of nature" from not only the husks of quackery, but also from any other external and hazardous admixtures. Practical work requires active substances from plants and characterized in chemical and physiological terms. This scientifically valid approach is what interests us.

Tibetan medicine regarded gases, bile and mucus as the internal causes of diseases in the presence of external hazardous pathogenic agents (though it is not said which of them in particular). The functional activity of "rgung" (gases) is described in an inter-

esting way: "It promotes breathing in and exhaling, the will to work, discharge of wastes... the specification of perceptions of sense organs and the influence of the spirit upon the physical organism."

Well, pardon me, but is it credible after the great discoveries of Pasteur, Mechnikov, Pavlov, Crick, Jansky and many others after unravelling the fabulous mysteries of the conditioned reflex, the genetic code, immunology, and microbiology to return to medieval ideas and methods only because they are of folk origin? Of course not!

Then why is it that we are called upon to return to all that by the men of letters, physicists, mathematicians and the many others who accuse official medicine vocally and in the press for prohibiting "folk medicine" and letting it be forgotten? Isn't it just the same as telling a modern chemist to return to alchemy, although today's chemistry has beyond any doubt developed from medieval alchemy. It is needless to speak of astronomy for the simple reason that interest in horoscopes has not yet waned.

It is easy to establish the religious character of folk medicine sources, which is based on **faith rather than on facts**. I should like to draw the attention of my readers to an idea which also attracted the attention of O. Balabanov, who produced a copious work on the secrets of Tibetan medicine. He quite justly stated the following: "It is natural

that ancient medicine, being dependent on religious and mystic ideas, attributed inexplicable causes of various illnesses at that time to supernatural powers, to the influence of "gdona" ("the evil spirit").

The exaggeration of the values of the folk ways of treating illnesses often leads to a generation of various types of medical occultism.

The problem of folk medicine is most closely associated with the cultural level of people, the stability of national traditions, and beliefs. Quite recently (in 1983) a physician of the International Red Cross described an event which took place in 1979 in a refugee camp in South-East Asia. In one of the camps where the centre of folk medicine had not yet been organized, a little girl contracted the measles. Her mother did not allow her to be taken to hospital since she was afraid of the "evil eye" of those foreign medical nurses. There is a superstition that the eye of the woman during her menstruation period is dangerous for a child who has the measles. The mother left her daughter in the camp, and begged for remedies from other refugees. The girl died. The substance of it all is not in scientific truth, but in the mother's conviction.

This is the situation in many developing countries, where in the extreme conditions of the absence of normal contemporary public health service folk medicine fills, as

it were, the gap in medical aid for the people.

The problem of folk medicine was discussed in detail at the conference held by experts of the World Health Organization. The group did an enormous amount of work and produced a number of very important definitions. Some of which are the following:

**The definition of folk medicine is:**

"...the sum total of all the knowledge and practical methods, the explicable as well as the inexplicable, that are used for diagnosis, prevention and liquidation of disturbances of physical, psychic and social balance, and which are based exclusively on practical experience and observations that are transferred from one generation to another in both oral and written forms.

Folk medicine can also be regarded as a stable alloy of constantly developing medicinal methods of "know-how" and inherited experience.

The folk medicine of Africa is also a sum total of practical means, measures and methods of any kind (material and non-material) which since time immemorial have helped the people of Africa suppress diseases and alleviate their own sufferings."

The folk doctors, practicing in India, define life as "a union of body, senses, reason and soul" and from this position regard "good health as a combination of physical, psychic, social, moral and spiritual well-

being". What is emphasized here is the moral and spiritual aspects, owing to which man himself and the medical system, which helps to keep up his state of health, acquired, as it were, novel dimensions.

**The definition of a folk doctor is:**

"...a person who, in the opinion of his community, knows the methods of rendering medical assistance by using plants, substances of animal and mineral origin, and other methods which are essentially founded on the social, cultural and religious sources, as well as knowledge, concepts and beliefs shared by the members of this community and referring to physical and social propitiousness, the causes of disease and incapacity."

On behalf of the World Health Organization this group of experts made a written statement that any system of medicine is modern if it is directed towards the solution of providing the people with competent medical help irrespective of the time and place as well as the cultural environment. From this it is possible to consider that the main difference lies not in the extent to which the aims and results are found to be different, but how diverse that cultural medium is in which the people practise the various systems.

Moreover, the group of experts pointed out that folk medicine does not present any new phenomenon as such, since it has always been an ingredient of any cultural

formation. However, in some developing countries folk medicine which does not avail itself upon the latest discoveries in science and technology experiences a period of stagnation.

It is necessary to mention that these profoundly humane statements made by the experts of the World Health Organization cannot be unconditionally accepted. First and foremost, the Soviet physician cannot possibly accept those methods which are based on beliefs and religions rather than on scientific study.

Public health is an integral part of all material and social conditions of society and cannot be divorced from the level of its development. It is precisely for this reason that in our conditions any incitement to resuscitate folk medicine, or, if otherwise stated, to give it official status, has nothing in common with the socialist world outlook.

Now let us contrast the rigid conditions of the needed use of folk physicians, when one medical man has to render service to hundreds of thousands of people, with the normal conditions of medical help in the Soviet Union. It is absolutely clear that there can be no social, economic, political, or ethical comparative analysis whatsoever.

## Chapter Five

# Knowledge or Faith

## (Conclusion)

### The Viability of Superstition

The notion that there exists a certain panacea, as well as miracle methods of treating cancer and other diseases unknown to the doctors, is deeply rooted in the human race because even the most civilized and cultural people are susceptible to superstition. Therefore, it is not by chance that in the West we can find many prospering fortune-teller, soothsayer, palm reader or others practising the same kind of "art".

A. Pralnikov good-naturedly describes how, after being on a long geological expedition in far away Chukotka, the geologists are expecting the helicopter that is supposed to take them back home. On the event of their departure they are hit with a violent snowstorm. It continues mercilessly for five days, and although fine weather finally arrives, they are informed that the helicopter can't reach them because of low-lying clouds. An expedition is organized to gather wood in the fresh snow, and after that they compete for preparation of the best dish made from pearl barley and tomato sauce. Shamanism arises within the group.

There are many ways to influence fate. For instance, if one sticks a knife into the ground at nightfall, the weather will be

fine in the morning. Or one is required to whistle all the time and not mention the word "helicopter". Those who are consistently ready every morning call the ones who do not roll up their sleeping bags or pack up the cups and the tea-kettle after breakfast adherents of a pseudo-theory, and wage an uncompromising war against them. However, all these methods are efficient only when it is necessary to alter the weather conditions. But we get the forecast from the meteorological station in Tilichki, which is on the shore of the Bering Sea behind the mountain ridge at about four hundred kilometres from where we are, and the clouds there must be low indeed.

The most radical method of all remains. It's common knowledge that the helicopter always lands when people are in the bath-house, when the first group of the bathers has not yet put on their clothes, while those in the second group have just soaped up. If it is too cold for a bath we all start to wash our clothes. Our unit lured the helicopter to a smokehouse where we had been preparing the graying all morning. The fish was hung in a tent that was no longer used, where we had set up a system of funnels and prepared smouldering wood. Half an hour was ample for us to take the fish off the hooks. The helicopter could not wait.

This, of course, is a joke, which shows how people try to influence fate. But

haven't people taken it seriously for centuries? Even today attempts of this kind have not ceased at all.

In 1986 three very large oncological conferences took place. An All-Union Congress of Oncologists was held in Rostov-on-Don in June. In August the capital of Hungary hosted the delegates to the World Congress of Oncologists, and lastly, the All-Union Congress of Oncologists was held in Leningrad in December. There were interesting reports, heated discussions, and resolutions were adopted, determining the long-term development of theoretical research, practice of the anti-cancerous struggle, the clinical methods of diagnostics and treatment of cancer. The strategy of oncological studies had clearly been determined.

### Strategy of the Anti-Cancerous Struggle

There are several equally important problems. The first of them is the initial prophylaxis of cancer. The World Health Organization considers this to be the most promising approach. According to the data furnished by this organization 30 per cent of all deaths from cancer in the USA are from smoking, nutrition factors being responsible for 35 per cent. Initial steps include medical awareness education and legislative measures, encouraging people to make individual decisions (to give up smoking, for instance) and anticipating activi-

ties of social significance such as protection of the environment. According to the data of research that has been conducted in many countries of the world, effective work connected with the initial prophylaxis of cancer can even now prevent nearly one third of the cases of malignant tumours. This information is particularly significant when 4.3 million people in the world die of cancer every year. At each of those three significant conferences the specialists came to the conclusion that it is necessary to begin the implementation of appropriate prophylactic measures.

It was previously mentioned that an important role in the initial prophylaxis must be attributed to the medical awareness education of people, or anti-cancerous propaganda. Experience shows that measures connected with anti-cancerous propaganda are most often structured on the basis of an obsolete scheme containing brief theoretical data on the origin of the illness. These dry figures illustrate the possibility in principle of recovery, followed by a description of clinical symptoms which must be examined in the presence of a doctor. In most cases this kind of lecture is not in the least convincing. The analysis of behavioural causes (not doctor's errors) of the disease's negligence casts sufficient light on deviations from prophylactic examinations, refusals to undergo preliminary tests and treatment. What supports this kind of atti-

tude is disbelief in the efficiency of prophylactic measures, the possibility of suppressing the disease when a tumour is detected, the fear of detecting a tumour, the wish not to know anything about it, and a peculiar kind of fatalism. Hence, the medical awareness education of the people should be directed at the struggle against the hazardous habits that promote cancerous tumours, the development of an intolerant attitude towards environmental pollution, overcoming disbelief in cures and fear of malignant neoplasms.

The second strategic trend of contemporary oncology is the active detection of people with malignant tumours. Methods of early detection developed earlier, such as the fluorography of the lungs and cytological analyses are quite effective. However, their results cannot meet the current demands, mainly because of difficulties and flaws in organization. At the All-Union Congress a report was given by Moscow physicians, who, with a restricted part of the population, managed to organize a dispensary with the use of modern efficient methods for the early detection of cancer. The results are given below.

They can actively detect lung cancer twice as often as by fluorography (59.0 per cent). Every third patient is detected in the I or II stage of the illness, when the chance of survival is exclusively high and 3-4 times greater than that of the III stage of the

disease. More than half the cases of breast cancer are detected during the I stage of the illness, when the rate of survival is 90 per cent.

The congresses in Rostov, Budapest and Leningrad discussed at some length organization of the anti-cancerous struggle, which would help to obtain the same results not with just a limited number of people, but with entire regions and, in the long run, with the entire country.

Thus, questions of the organization of the current level of the doctor's competence and of adequate technical maintenance are regarded as the most important aspect in the struggle of mankind against cancer. In Rostov-on-Don and Leningrad a comprehensive program of organization methods was outlined. The World Health Organization in Budapest as well as in Leningrad stressed that effective national programs of the struggle against cancer could be enhanced by means of a more rational use of the available resources. The organization pointed out that within the framework of the existing systems of medical and sanitary help significant results could be achieved with the involvement of voluntary organizations and state service agencies, since their activity is related to public health.

I mention this only because I hope to draw the attention of my readers who are associated with the above organizations, and could use their influence to help protect

people from the scourge of the twentieth century—malignant tumours.

Where diagnostics is concerned in this particular part of clinical oncology there have been major achievements. All the malignant tumours can be classified into three groups. The first group includes the so-called visual tumours, or those that can be seen. They are tumours of the skin, oral cavity, mammary gland, external sexual organs, rectum, peripheral lung cancer and others. It is our duty to find people who have neoplasms of this group among the healthy ones and offer them opportune treatment since in the first stage of the disease it is highly effective (from 89 per cent to 100 per cent of the patients are cured). The second group comprises tumours which we in principle can detect in time, although it sometimes calls for the use of complex technical means and the knowledge of who is supposed to undergo this kind of examination. This group includes malignant tumours of a large number of internal organs (stomach, large intestine, ovary, central lung cancer, etc.). The third and last group is made up of tumours detected only through the appearance of clinical features of the disease (the tumours of the brain and its meninges, malignant illnesses of the blood, sarcomas of the bones and others).

All this was published over ten years ago and lists of tumours representing the three

groups were compiled and even bore fiscal significance. For instance, someone complained that his doctor did not detect a tumour of the third group, but it was impossible to accuse him of such negligence. Conversely, an error in detecting cancer of the first group is considered punishable. As a result of the emergence and propagation of new technology in the last ten years, the composition of the groups of tumours has been substantially changed. There have appeared computer tomography, powerful ultrasonic detectors with storage, nuclear and magnetic resonance, and new radio-nucleic methods which help to solve extremely complicated diagnostic problems. For instance, quite recently, surgery was required to identify the place of a tumour (whether it was located in the uterus or the ovary). And any operation, as we know, is always fraught with complications which aggravate the situation to a considerable extent. The ultrasonic instrument employed now solves this diagnostic problem within the shortest possible period of time and the patient feels practically nothing. What the oncologists expect today is an abundance of devices and an adequate organization of their exploitation. Until now the number of instruments is insignificant and they cost a lot. However, life goes on, and the possibilities of employing contemporary diagnostic apparatus are on the increase every year. There appeared air transport, television,

refrigerators and many other things which have become essential in our everyday experience, and without which no one today could imagine a normal way of life. It is exactly the same with diagnosing malignant tumours. Oncological diagnostic studies will transfer the cart to the car with a computer controlling system. Let us hope that it will take years and not decades. Much depends on the public's attitude and those who are at the head of industry. The struggle against cancer for the health and happiness of the people is a common cause.

But the treatment of patients suffering from malignant tumours is entirely the concern of oncologists. Strange as it may seem, this opinion is not shared by all physicians. The fact is that oncology originated in the depth of general surgery. In this country the inception of oncology was connected with such pre-eminent surgeons as L.L. Levshin, Vladimir Zykov, Nikolai Petrov and Peter Herzen. Hence it is customary for a considerable part (about 40 per cent in the USSR) of oncological patients to receive their treatment in the surgical clinics and hospitals. In the West it is generally the radiologists and chemotherapyists who are regarded as oncologists. Surgery is the source of many contemporary "narrow" specialities, e.g. urology, phthisiology, children's surgery, otorhinolaryngology and others. I can still remember that in a surgical clinic patients who were operated on

included those who suffered from tuberculosis of the lungs and joints, nephrolith, etc. General surgeons find it most difficult to part with oncological patients, not because a good surgeon **isn't able** to perform a stomach resection, pneumonectomy, resection of thyroid gland, or larynx. The fact is that he **can't** perform a number of additional investigations in the course of the operation, which have become ordinary in oncology, but are totally non-characteristic of general surgery. There have been achievements in the ancillary methods of treatment which independently or in combination with surgery require special conditions and particular knowledge of physicians. All this is at the disposal of professional oncologists.

In 1986 a tendency developed in oncological surgery that makes it possible to preserve organs and retain their functions. In the course of 90 years (beginning with 1896) the tendency towards maximum radicalism dominated. Some oncologists used to say: "A small tumour means a big operation, a big tumour means no operation at all." Others vociferously proclaimed: "A small tumour calls for a big operation, and a big tumour calls for a still bigger operation." Now the time has come to say: "A small tumour requires a small operation, and a big tumour requires a combined form of treatment." Two reasons can explain the change of mottos.

First has been the successes of active detection. Finally we could see and treat at the oncological establishments hundreds and thousands of patients with small tumours (I and II stages), making it possible to preserve at least part of the organs and their functions.

The second factor is the development of radio- and chemotherapy. The former was amply discussed earlier. Radiology is an independent subject very closely connected with oncology, but has its own technological, scientific and methodological foundations. Chemotherapy has become particularly significant. It would be more correct to call it oncotherapy (by association with oncosurgery) since we are concerned here not only with the chemical preparations, but also with medicines of biological origin, e.g. hormones, interferon, etc.

After studying the treatment of cancer, the World Health Organization came to the conclusion that 40 per cent of the malignant tumours can be completely cured, while in other cases it is possible for an incomplete but effective cure of varying durations. For appropriate results it is essential for the rational combination of surgical, radiation, medicinal methods of treatment, as well as the sustaining effects, including the use of anaesthetic agents, antibiotics and blood preparations. At the 1986 congresses 5 categories of tumours, according to their medicinal sensitivity, and 14 quite

accessible preparations were defined. Every year the number of active preparations increases, which means that in their practical work the oncologists further develop the inventory of anti-cancerous agents.

At the 1986 conferences research into work and social rehabilitation of oncological patients who had completed their radical treatment was clearly voiced for the first time. This in itself is particularly interesting and worthy of a special book.

### **Unvanquishable Dogmas**

Sensational reports and speeches are not usually made at conferences and congresses. However, the latest congress in Leningrad was an exception and drew particular scientific interest.

In the second chapter of this book the readers became familiar with the fact that as early as 1909 Paul Ehrlich advanced the immunological concept which, over the period of the following eighty years or so, was prevalent in the minds of a large number of oncologists. For the past twenty years immunology has claimed to function as the sole integrating concept that can explain everything. Briefly, here is the following interpretation. The cell, which has been transformed into a malignant one, cannot inspire the development of malignant tumour until there occurs a penetration through the immunological barrier and there emerges

a marked decrease in the activity of immune system, or so-called immunodepression. The scientists who voiced doubt in the tenability of this theory were drowned out by the acclamation of its proponents. Quite a few considered the argumentation substantial and cogent.

Finally, at the IV Congress of Soviet oncologists in Leningrad, Academician N.V. Vasiliev very convincingly proved, with his assumptions based on the study of a great amount of literature and his own experimental and clinical observations, that there could be no possibility of any immunodepression in the course of the development of cancerous tumour. He made it quite clear that a mature form of immunodepression can be developed only in an advanced and neglected process. There was every reason to believe that scientists would either unconditionally accept the opinion of the speaker or come up with seriously substantiated objections. However, neither of these took place. The first speaker to take the floor at the next session began his report with the words: "The role of immunodepression in the pathogenesis of malignant tumours is common knowledge." This is a marvellous example of the resilience of dogmas and hypotheses. Such is the property of the human brain even the brain of a man who is properly trained in daily research.

The faith in quack doctors, panacea, parapsychology, and their diagnostic and med-

ical significance are nothing exclusive. It is only a part of the pseudo-scientific assumptions which dilettantes try to substitute for science, at times rather successfully replacing knowledge with faith. In the field of exact sciences, aeronautics, geography, and archeology, the propaganda of parascientific information and whimsical ideas as such has a particular ideological importance, giving rise to "ersatz-religion", establishing new forms of obscurantism. This is nothing other than religion, faith in charlatans, unrecognized phenomena and others. Religion is not only extremely viable, but also active, while its influence changes forms. One cannot remain an atheist and believe in "particular" miracles. There is no alternative. This book is not for the religious person who **has replaced knowledge with faith**. It will not convince such a reader, since the author is a confirmed atheist and has no intention of refuting religion as a social-significant reality in a book that is written on quite a different subject. Nevertheless, I consider it absolutely necessary to determine a clear-cut position: it is either science that bears progress, knowledge, and redemption of mankind from evils, such as cancer, in the course of its development, or obscurantism and blind faith.

Within the domain of medical science, particularly oncology, quackery and charlatanism are extremely dangerous since they

directly jeopardize the health and life of people.

The struggle against pseudo-science in the field of public health acquires definite practical significance, remaining a link in the ideological struggle against religion and obscurantism.

As already been pointed out, non-scientific methods of treatment can bring about irretrievable harm by distracting the person from the required help.

I should like to mention a woman who came to the oncological dispensary in Moscow. It was discovered that she had breast cancer in a curable stage. She did not want to be operated on. Neither did she respond to the invitation of the district oncologist. She moved and could not be observed by the doctors any longer. In two years her brother, extremely worried about her state of health, asked for a consultation. When I examined the patient, I was astounded to find a huge gaping ulcer in the gland. Around it were many daughter nodes of the tumour. All the groups of lymph nodes were affected by metastases. There could be no possible way of helping her. It then transpired that the patient had been treated by a "herbalist" who told her that the tumour would first become dead, then would putrify, expose itself and flow out. The most horrible thing in this sad story is that the quack knew perfectly what suffering she had doomed to the unfortunate patient...

We managed to find the address of the criminal and sent the information to the public prosecutor.

It was a genuine crime in the guise of "folk medicine".

The above example shows that in a civilized society the cover of "folk medicine" is frequently used by charlatans, whereas actually folk medicine in highly developed countries has assimilated itself with ordinary medicine.

The best "remedy" for quackery and charlatanism is growth in the general culture of the population, achievements in science, and increasing trust in doctors. It is precisely doctors who are profoundly interested in discovering ways to suppress diseases. There is no one who puts more energy, work, and personal time as those responsible for the health of the population. We should trust only them. This is not blind faith but faith in the achievements of science and the humanism of doctors.

